

# National Poisons Information Service

Annual Report 2009/2010 and Five Year Review



## National Poisons Information Service

Commissioned by the Health Protection Agency through its Centre for Radiation, Chemical and Environmental Hazards

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# Foreword

This National Poisons Information Service (NPIS) Annual Report for 2009/10 covers the fifth year of the NPIS working as a UK-wide integrated network, which was introduced by the HPA in 2005. The Report reviews both the service support to the wider NHS in the last year and changes to the service over the five year period.

The NPIS exists to support the wider NHS across the UK, to decrease the burden of the effects of poisoning on the population, by providing consistent information to support local carers in optimising the management of their poisoned patients, whether patients present to NHS Direct/NHS 24, primary care or the acute hospital services.

The main purpose of the UK NPIS Annual Report is to provide statements of accountability and governance to the main joint funders of the service as well as to the HPA. These are the English Department of Health, the Scottish Assembly Government, the Welsh Assembly Government, the Northern Ireland Department of Health and Beaumont Hospital, Dublin, on behalf of the Republic of Ireland government.

This year's review shows that both the NPIS and UKTIS (the UK Teratology Information Service) continue to provide a dynamic and responsive service to meet the constant new poisoning challenges presented by patients and their carers. The emergence of H1N1 pandemic flu and new legal drugs of abuse such as cathinones, especially mephedrone, absorbed much NPIS and UKTIS time during the year. In addition, the

service maintained its other expected routine work, particularly updating the 14,000 TOXBASE monographs necessary to ensure that up-to-date online advice is available to the service users. The service also developed advice for many new products, including liquid detergent products, and updated its advice to reflect the constant reformulation of chemical and pharmaceutical products available.

UKTIS, a part of the NPIS, has had a major review, resulting in the appointment of its first clinical lead and upgrading of its main database to record the outcomes of pregnancy in women exposed to drugs and chemicals.

NPIS staff have once again been very active in research, both nationally and internationally, producing data that underpin the advice offered by the service to UK clinicians. International legislation is mandating enhanced joint European working that is being led by the Health and Safety Executive in the UK.

Planned government-led changes to the status of the HPA and public health arrangements in England will inevitably mean change in the future commissioning arrangements for the NPIS and UKTIS, but the service as currently specified is well placed to embrace these changes positively.

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# Executive Summary

## Background

Poisoning continues to be a substantial public health problem, accounting for over 140,000 NHS hospital admissions a year. The majority of people affected are cared for initially within hospital emergency departments and minor injuries units. Concerned patients and carers may also contact helplines (NHS Direct in England and Wales and NHS 24 in Scotland) for advice about possible poisoning and the need for attendance at an appropriate healthcare provider.

Since 2003 the Health Protection Agency has commissioned the National Poisons Information Service (NPIS) to support healthcare professionals within the UK in providing safe and effective diagnosis and management for people with suspected poisoning. The four units of the service are based in Birmingham, Cardiff, Edinburgh and Newcastle. The service has been expanded to involve additional on-call support from consultants with clinical toxicology training, working in London and York. The availability of expert advice also prevents unnecessary hospital admission when the risk of toxicity is low. The NPIS is a 24-hour-a-day service provided by scientifically qualified specialists in poisons information (SPIs) and medically qualified consultant clinical toxicologists.

Case data from telephone enquiries are entered on to a confidential central secure database, UKPID, allowing coordinated data collection, better collaborative working and improved access to statistics related to poisoning enquiries. Data are also collected on usage of the NPIS online poisons database, TOXBASE. Examples of these data are provided in this report, and are used for public health surveillance purposes.

## Activity

In 2009/10 the NPIS handled in excess of 578,000 enquiries by TOXBASE or telephone. Use of TOXBASE has been encouraged as a first point of call for healthcare professionals. During the year there were 525,000 user sessions, a reduction of 8% compared with the previous year. In order to support this activity a major task for the NPIS units is to maintain the database held on TOXBASE, the backbone of the service. Almost 4,900 TOXBASE entries were written or revised during this year.

There were 53,300 telephone enquiries made to the service in 2009/10, a slight fall of 6.5% compared with the previous year. The NPIS is often consulted about more serious cases of poisoning, and a significant proportion of enquiries are referred to NPIS consultants for their expert opinion. In 2009/10, a total of 1,245 such high-level referrals were made, a 15% reduction over the previous year.

NHS acute hospitals account for the majority of NPIS activity, with over 60% (297,000) of the TOXBASE sessions and over 30% (16,000) of telephone enquiries coming from this source. Enquiries from NHS Direct and NHS 24 accounted for 30% of TOXBASE sessions and 20% of telephone enquiries.

The NPIS includes the UK Teratology Information Service (UKTIS), which provides information on maternal and fetal effects of exposures to drugs and other chemicals in pregnancy. In 2009/10 there were approximately 36,000 accesses to the pregnancy information on TOXBASE, and UKTIS answered around 4,200 pregnancy-related telephone enquiries, a similar figure to that for 2008/09.

## Areas of Interest in 2009/10

Household products are a very common source of enquiries to the NPIS. This year we have evaluated the effects of household cleaning products. These data illustrate the potential hazard of some types of product, particularly fabric cleaning products, in young children.

In 2009/10 there was a large increase in enquiries to the NPIS in relation to certain new drugs of misuse, especially synthetic cathinones. Monitoring NPIS enquiry data identified the rapid increases in the use of these agents and these data helped to inform government policy on their control.

Pharmaceutical products remain the most frequent reason for enquiry to the NPIS. This year we have illustrated changes in enquiry patterns for antidepressants over the past five years. We also highlight the issue of quinine, a product widely used in the UK for leg cramps which, in overdose, can cause serious toxicity, including permanent blindness.

We also report on serious pesticide poisoning and trends in carbon monoxide enquiries.

Finally, there has been an increase in the use of alcohol-based hand cleaners, both in NHS facilities and elsewhere, partly in response to concerns about MRSA and pandemic flu. Enquiries to the NPIS about ingestion of these products have been increasing and these have provided useful information on the clinical features that result.

## Governance and Quality Assurance

It is essential that the information provided by the NPIS is handled in a way which satisfies governance procedures and is as accurate, up to date and relevant as possible. To achieve this, the NPIS holds regular national meetings for staff to promote professional development and to support consistent working across the four sites. There is systematic review of consultant level referrals to ensure that opportunities to improve the content of TOXBASE are taken and that the information provided reaches an agreed standard. User satisfaction surveys continue to indicate a very high level of overall satisfaction with the service provided, by TOXBASE, telephone enquiry services, and consultants.

## Five Year Review

2009/10 marked the fifth year of networked arrangements for the NPIS units, following establishment of a common NPIS rota in 2005. Over this period the NPIS has developed into a more cohesive national organisation, adopted new common operating procedures and standard practices, with coordinated on-call systems, call-switching and a single UK consultant clinical toxicologist rota. To support this, there has been an expansion of the numbers of NHS consultant clinical toxicologists working in the NPIS. New versions of the principal databases, TOXBASE and UKPID, have been developed. There have also been improvements within UKTIS. The NPIS has adopted unified and coordinated quality assurance surveys of its activities.

## The Future

The aim of the NPIS is to develop its services within the expected tight budgetary framework. Challenges over the next few years will include support for the London 2012 Olympic Games, meeting the public health need to monitor and address new trends in poisoning and increasing our role in poisons prevention, while at the same time sustaining our current NPIS outputs, in particular TOXBASE and telephone response systems.

New European regulations affecting product labelling are also likely to increase demands on the NPIS. Requests for NPIS data from government agencies to support licensing decisions for pharmaceuticals, pesticides and chemicals are likely to increase and put additional pressure on existing scarce resources.

## Research

Although NPIS staff are not funded to perform research as a core function, many staff are involved in research. This is usually funded by other parts of the NHS or by universities. This is an important function since it supports new developments in clinical care of poisoned patients and increases the evidence base for NPIS advice on poisons management. It also benefits the overall public health.

In the report we illustrate research performed by staff associated with the NPIS by highlighting work in a number of areas. These include paracetamol poisoning, the effects of co-proxamol, psychoactive drugs, heavy metals and pesticides, and drug exposure in pregnancy.

## Wider NPIS Contributions

NPIS staff make many contributions to academic and regulatory activities, nationally and internationally. The very wide extent of these is illustrated in appendices to the report.



# 1 Introduction

The National Poisons Information Service (NPIS) is a network of dedicated units which is commissioned by the Health Protection Agency (HPA). All these units are linked to clinical treatment facilities within teaching hospitals in the UK.

The NPIS has provided information by telephone since 1963. The poisons information database, TOXBASE ([www.toxbase.org](http://www.toxbase.org)), was introduced in 1982 and was transferred to the internet and adopted as the first-line information source for healthcare professionals in the UK in 1999. Over the past ten years the NPIS has changed both its structure and functionality. Its focus remains on assisting colleagues in all parts of the NHS to manage cases of poisoning. The information and advice provided by the NPIS is based on the published literature, experience from NPIS telephone enquiry data and direct clinical experience of difference types of poisoning managed in NPIS-linked clinical departments.

Poisoning continues to be an important public health issue in the UK. It accounts for over 140,000 NHS hospital admissions in the UK each year (just under 1% of the total number), creating a significant workload for health service staff, especially hospital emergency departments and minor injuries units. Many thousands of different types of agent are involved and the appropriate management of poisoning is therefore a major task for the NHS, especially when new or unfamiliar agents are involved.

There has been a small reduction in poisoning-related patient admissions to hospitals throughout the UK over the past decade. This may reflect in part national strategies aimed at reducing suicide and self-harm. The patterns of drugs involved have also changed in line with new approaches to therapy. For example, newer antidepressants and antipsychotic drugs are increasingly involved. Withdrawal of more toxic agents, such as the analgesic co-proxamol, has reduced exposures to these agents. These hospital admission data, illustrated by NHS finished consultant episodes, do not reflect the very many attendances to emergency departments of patients who do not require admission, nor the large numbers of enquiries through NHS patient helplines (NHS Direct in England and Wales and NHS 24 in Scotland).

A core responsibility of the NPIS is therefore to assist in the appropriate triage, referral, assessment and treatment of patients in all settings within the NHS. The majority of people dying from poisoning do so before healthcare assistance is summoned. Nevertheless there are still opportunities to improve care for those with more severe poisoning, thus reducing morbidity or mortality. At the same time NPIS advice reduces the need for unnecessary hospital attendance by those who have been exposed to substances of relatively low toxicity.

Over the past five years there has been an expansion in the number of consultant staff available to assist colleagues in the management of more seriously unwell cases. Some consultants working within the NPIS are now based in acute hospitals geographically separate from the four main NPIS units. This expansion in the availability of expertise supports UK resilience. Since the NPIS also receives many enquiries about children it has formalised existing support from expert paediatricians, particularly to assist in the review of standard advice for the management of poisoning in children.

Advice on the management of household exposures is a common source of NPIS enquiries. This year the NPIS has been involved in a specific project on the toxicity of household products.

The NPIS is funded primarily through 'Government Grant in Aid' from the UK health departments, but receives some contract income and research income for specific projects, notably in 2009 the award of a new three-year project from the Health and Safety Executive concentrating on monitoring health effects of exposures to pesticides and biocides.

Information on NPIS activity in 2009/10 is given in this report. In addition, an overview of NPIS developments and contributions over the past five years is provided.

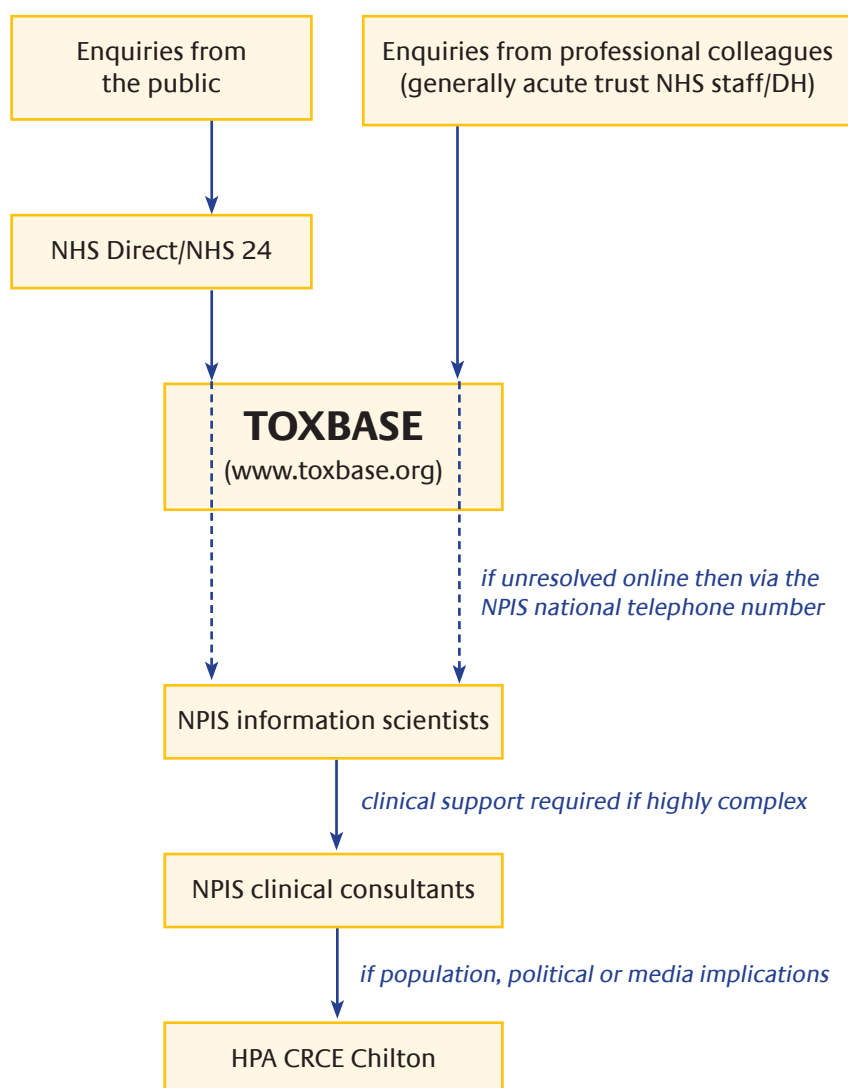
## 2 NPIS Structure

The NPIS provides a 24-hour-a-day consultant-supported clinical toxicology on-call service that gives advice on the diagnosis and management of poisoning, including the clinical effects of exposures arising from chemical incidents and accidents.

There are currently four NPIS 'provider' units (two in England and one each in Scotland and Wales). The service has 24-hour consultant clinical toxicologist support provided by NHS consultant staff in all four NPIS units and colleagues in two other NHS hospitals (Guy's and St Thomas' NHS Foundation Trust and York Hospitals NHS Foundation Trust). NPIS consultant clinical staff also provide specialist clinical services to their local populations.

The primary source of information provided by the NPIS is its online database, TOXBASE ([www.toxbase.org](http://www.toxbase.org)), which is available to all UK healthcare professionals who register for it. TOXBASE underwent a software update in 2008 and was moved to a new platform. The NPIS also provides a 24-hour telephone information service for healthcare professionals using a single national telephone number (0844 892 0111) when further advice or information is needed.

In Northern Ireland, the Regional Medicines and Poison Information Service in Belfast provides a daytime information service on poisons; healthcare professionals use the NPIS out-of-hours. The NPIS is also contracted to provide poisons



How poisons enquiries are answered



information for users in the Republic of Ireland: TOXBASE is provided to major hospital emergency departments and to the National Poisons Information Centre in Dublin. Out-of-hours telephone support is provided by both NPIS specialists in poisons information (SPIs) and NPIS consultant clinical toxicologists.

NPIS activity is reflected in TOXBASE usage and telephone enquiries. The increasing use now being made of TOXBASE, encouraged by NPIS promotional exercises, allows staff to perform more strategic work for the service, including production of TOXBASE monographs. When first received, telephone enquiries are managed by specialists in poisons information who may have a scientific, nursing or pharmacy background. NPIS consultant clinical toxicologists are available for further advice as required.

Information on the potential toxicity of drugs and chemicals in pregnancy is provided by the UK Teratology Information Service (UKTIS, formerly NTIS). This was established as part of NPIS Newcastle in 1995. Information on aspects of the toxicity of drugs and chemicals in pregnancy is increasingly being made available on TOXBASE, and the service follows pregnancy outcomes in potentially exposed pregnant women to improve knowledge in this challenging area.

In order to maintain a consistent approach, irrespective of the provider unit answering an enquiry, it is essential to have national mechanisms for addressing issues that affect the service. A key development over recent years has been the formalisation of such arrangements within a UK strategic framework.

Commissioning issues are dealt with by the HPA NPIS Commissioning Group, which meets quarterly (or more often if required). Clinical issues, including clinical governance matters, are discussed at the NPIS Clinical Standards Group, which also meets quarterly, usually on the same day as the HPA NPIS commissioning meetings. These meetings are attended by a representative of the commissioner, a senior clinician from each provider unit, and a senior specialist in poisons information. Invitations are also sent to representatives of the National Poisons Information Centre in Dublin. Operating procedures are updated frequently and made available to NPIS staff on TOXBASE.

To encourage a common and evidence-based approach to the clinical management of poisoning, all NPIS clinical and information staff are invited to attend continuing professional development (CPD) meetings, which deal with new data and important clinical issues. These occur three times a year and have now been taking place for four years. Each provider unit hosts the event in turn.

There are also regular meetings and teleconferences of the TOXBASE Editing Group and the UKPID User Group. These also have representation from each provider unit and discuss issues relating to TOXBASE and UKPID, the common NPIS call-logging software. The National Poisons Information Centre in Dublin and the Northern Ireland Regional Medicines and Poison Information Service also contribute to TOXBASE development.

All NPIS telephone enquiries are now recorded for governance purposes and data logged within a national database (UKPID). This allows data on cases to be analysed more readily and is used to inform clinical management of subsequent cases. It can also be used to support UK pharmaceutical licensing decisions by the Medicines and Healthcare products Regulatory Agency (MHRA), and for studying the epidemiology of poisoning as reported to the NPIS.

## 3 2009/10 in Focus

### 3.1 Overall Service Profile

The total number of TOXBASE user sessions (defined as one logon to the TOXBASE site during which the user may access one or more products several times) was 524,986; a decrease of 8% on the number of sessions in 2008/09 (Figure 3.1). This may in part be due to unusually high activity in 2008/09 following the introduction of new software. There has been a substantial increase in TOXBASE use over the last ten years.

The number of user sessions includes 4016 educational sessions, an 11% increase on the 2008/09 figure.

Sessions from all the NPIS units and from the Northern Ireland Regional Medicines and Poison Information Service have been excluded from further detailed analyses, as these units may access TOXBASE for training/educational purposes, to access operating procedures or for monograph-writing purposes (NPIS units only), as well as telephone answering.

Therefore a total of 479,951 sessions originating in England, Scotland, Wales and Northern Ireland have been analysed further in this report. Sessions originating overseas are presented elsewhere (Box 3.1).

There were 1,366,699 individual product accesses in 2009/10; applying the same criteria as for session data, 1,172,082 product accesses have been analysed further.

#### BOX 3.1 Non-UK and Subscription Users of the NPIS

The NPIS provides out-of-hours telephone support under contract to the Republic of Ireland. During 2009/10 there were 2026 telephone enquiries routed to the NPIS national telephone service from this source. NPIS units also received 341 telephone enquiries from the Channel Islands and the Isle of Man (an increase of 1.5% on the 2008/09 figure).

As well as the out-of-hours contract, the NPIS provides TOXBASE specifically tailored to medical professionals in the Republic of Ireland; in 2009/10 there were 14,503 TOXBASE sessions made by 56 registered Irish users. The majority of Irish sessions originated in hospital emergency departments.

TOXBASE is provided under special agreements to users in 35 countries outside the British Isles; 13,203 TOXBASE sessions were made by these users, with those in Brazil (25%), Belgium (12%), Australia (9%), Hong Kong (9%) and Austria (8%) the most frequent users; the majority of sessions were made by poison centres (around 38%) and hospital departments (14%). The most common products accessed by users in the UK, the Republic of Ireland and overseas are compared in Table 3.4 (see page 12). Although paracetamol and ibuprofen were the most commonly accessed pharmaceutical agents in all countries, the data suggest different patterns of exposure to some psychoactive drugs.

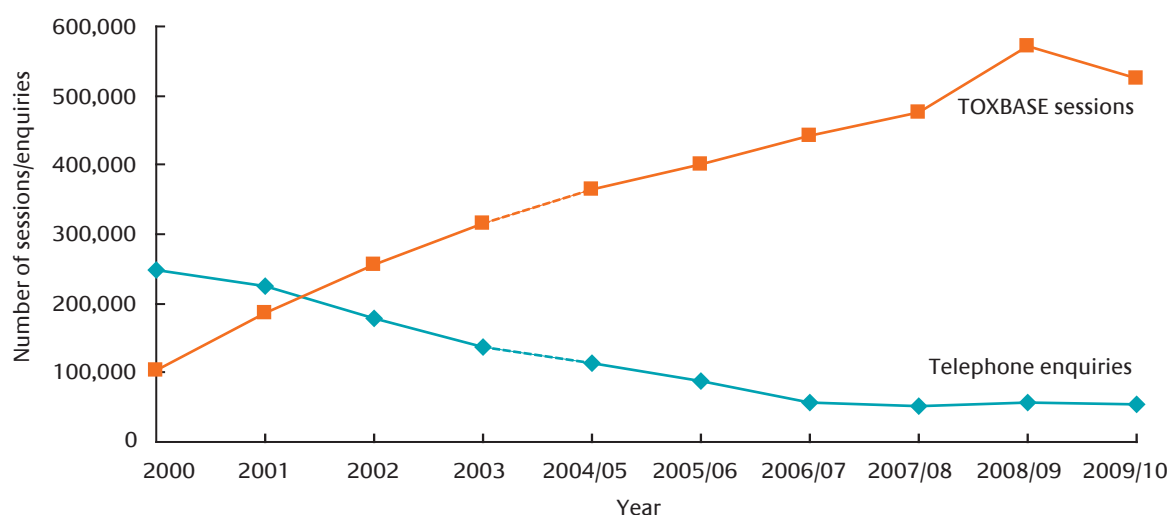


FIGURE 3.1 Telephone enquiries and TOXBASE sessions from 2000 to 2009/10 (data for 2000–2003 by calendar year; subsequent years by financial year)

The total number of telephone enquiries received by the NPIS in 2009/10 was 53,329 (excluding 4213 calls made to UKTIS) – this is a decrease of 6.5% from 2008/09 (Figure 3.1). The analyses presented in this report include only telephone enquiries to the NPIS which related to patients, of which there were 52,057.

Table 3.1 shows the number of poisons enquiries from UK countries and relates these to population. Table 3.2 shows the variation in TOXBASE use by strategic health authorities in England compared with use in Scotland, Wales and Northern Ireland.

Figure 3.2 shows that hospital departments and NHS Direct/ NHS 24 users are responsible for the majority of TOXBASE sessions – 297,059 (62%) and 142,458 (30%), respectively. In contrast, telephone enquiries received were distributed more evenly across hospital, primary care and NHS Direct/ NHS 24 users – 16,719 (32%), 15,714 (30%) and 10,238 (20%), respectively. This is because GPs are more likely to call the NPIS than access TOXBASE.

The great majority of TOXBASE sessions from hospital users were from emergency departments (258,072 or 87%).

TABLE 3.1 Origin of poisons enquiries to the NPIS in 2009/10

Country	Telephone enquiries (involving patients)		TOXBASE sessions		Combined total	
	Number	Rate per 100,000 population*	Number	Rate per 100,000 population*	Number	Rate per 100,000 population*
England	42,999	83.5	386,996	752.0	429,995	835.5
Scotland	2,156	41.7	52,791	1,021.4	54,947	1,063.1
Wales	3,892	130.2	29,197	976.5	33,089	1,106.6
Northern Ireland	643	36.2	10,967	617.9	11,610	654.1

\* Based on 2008 estimates from [www.statistics.gov.uk](http://www.statistics.gov.uk), accessed July 2010

TABLE 3.2 Regional distribution of TOXBASE sessions in 2009/10

Country	Strategic health authority	Number of TOXBASE sessions	TOXBASE sessions per 100,000 population*
England	East Midlands	33,093	747.1
	East of England	40,949	716.2
	London	46,594	607.6
	North East	22,757	885.3
	North West	59,858	870.8
	South Central	34,212	842.8
	South East Coast	21,185	491.6
	South West	40,717	781.4
	West Midlands	41,659	770.3
	Yorkshire and The Humber	45,919	880.1
Scotland	–	52,791	1,021.4
Wales	–	29,197	976.5
Northern Ireland	–	10,967	617.9

\* Based on 2008 estimates from [www.statistics.gov.uk](http://www.statistics.gov.uk), accessed July 2010

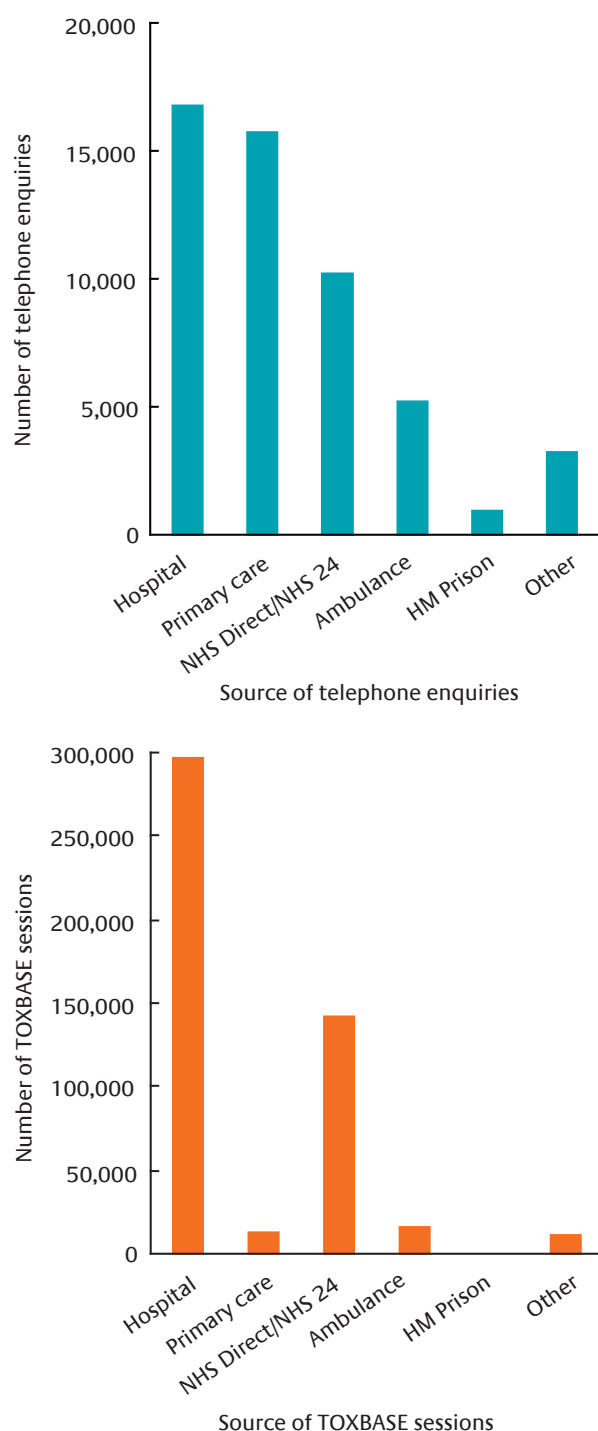


FIGURE 3.2 Telephone enquiries and TOXBASE sessions by type of user in 2009/10

The second largest group of hospital users were medicines information departments and pharmacies (25,975 or 9%). Of the telephone enquiries, 45% (23,276) were made by doctors and 41% (21,139) by nurses; these proportions are almost identical to those in previous years. The ages of patients who were the subject of telephone enquiries are shown in Figure 3.3; one-third of the telephone enquiries involved children under the age of five years.

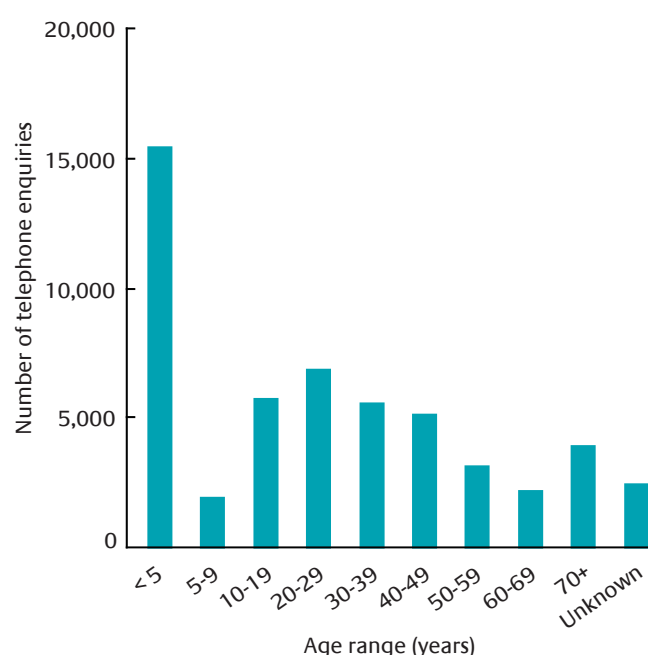


FIGURE 3.3 Age of patients reported in telephone enquiries to the NPIS in 2009/10

Females were involved in 55% of telephone enquiries. This is similar to that in previous years. Figure 3.4 shows the type of poisonings reported to the NPIS during telephone enquiries in 2009/10; the largest single category of telephone enquiries was accidental ingestions which occurred at home. The majority (88%) of enquiries related to ingestion, with 4% to inhalation, and 8% to other routes. Exposures in the home accounted for 87% of enquiries, while 3% were in the workplace, 2% in hospital or medical facilities, and 8% in other locations, e.g. schools.

The types of agents that were the subject of TOXBASE sessions and telephone enquiries are shown in Figure 3.5. For both datasets pharmaceuticals are the most common source of enquiries (69% and 64%, respectively) followed by household products (12% and 17%, respectively).

## BOX 3.2 TOXBASE Editing

With the increased use of TOXBASE by healthcare professionals as the first, and often only, source of advice, it is essential that the information it contains is kept as up to date as possible. Because of the numbers of monographs involved, this is a very substantial workload, which is shared by all the NPIS units. TOXBASE entries that are new to the database and major updates are circulated to all the NPIS units for review before going 'live'. The database is updated on a daily basis.

The HPA NPIS TOXBASE Editing Group includes representatives of clinical and information staff from all the NPIS units, together with representatives from related poisons centres, a public health physician and a scientist from the HPA Centre for Radiation, Chemical and Environmental Hazards. It meets approximately three times a year to agree policy for TOXBASE development, discuss the format of TOXBASE monographs, and agree and prioritise work programmes on the database content.

Areas of clinical controversy or uncertainty are discussed at regular meetings or teleconferences of the TOXBASE Editing Group or by the NPIS Directors at the quarterly NPIS Clinical Standards Group meetings. Monthly literature reviews are circulated as *Current Awareness in Clinical Toxicology* (see Section 3.5), to assist in updating TOXBASE.

The NPIS aims to review each of the approximately 14,000 entries on TOXBASE at least every four years. Consistent with this aim, during 2009/10, 4897 entries were written or revised, an increase of 28% over the figure for 2008/09.

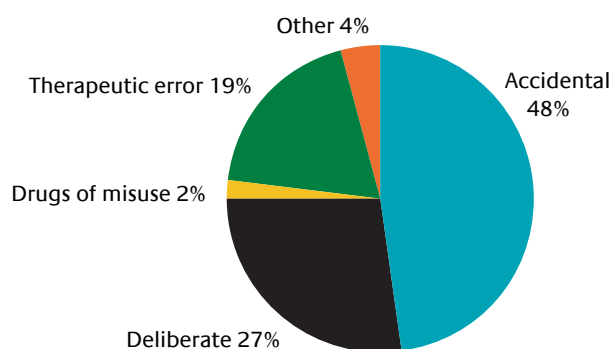


FIGURE 3.4 Types of poisonings as reported in telephone enquiries to the NPIS in 2009/10

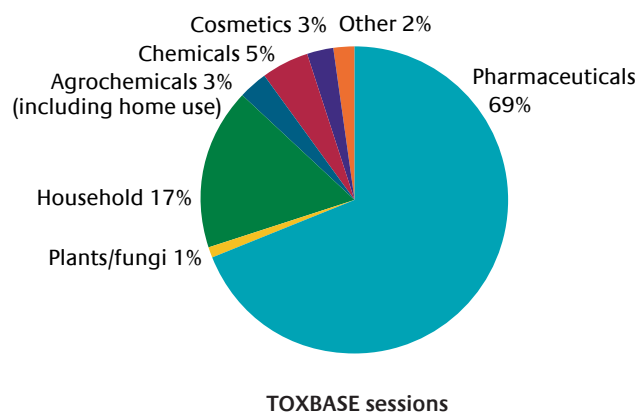
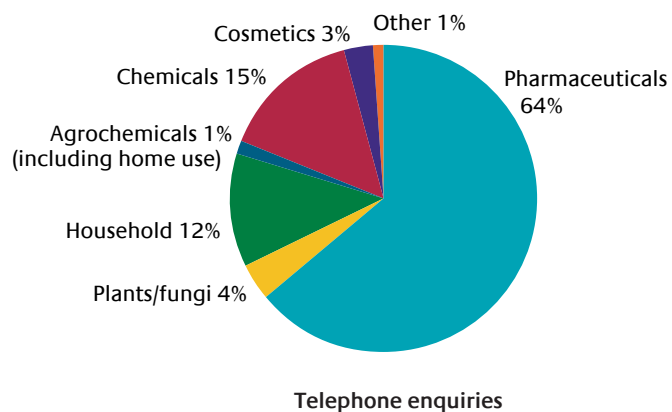


FIGURE 3.5 Types of agents involved in telephone enquiries and that users accessed during TOXBASE sessions in 2009/10

Table 3.3 shows the ten pharmaceutical agents that were the most frequent subject of telephone enquiries, with the corresponding TOXBASE accesses given in Table 3.4. It should be noted that the number of enquiries and accesses listed for paracetamol do not include those for compound analgesics (e.g. those containing both paracetamol and codeine), which are counted separately. The pattern of enquiries and accesses is similar to that of the previous two years, with analgesics and antidepressants predominating. The most common products accessed on TOXBASE by users in the UK, the Republic of Ireland and overseas are compared in Table 3.4.

Table 3.5 shows the household agents most frequently accessed during TOXBASE sessions in 2009/10; the most common were surfactants (26,812) and bleaches (16,854). The surfactant accesses include a range of different products containing surfactants as the active ingredient, e.g. non-ionic, anionic and cationic surfactants. Aspects of this type of exposure are also discussed in Section 4.1.

TABLE 3.3 Pharmaceutical agents: top telephone enquiries in 2009/10

Agent	Number of enquiries
Paracetamol*	5,417
Ibuprofen	2,517
Co-codamol	1,339
Diazepam	1,164
Citalopram	1,140
Zopiclone	1,069
Fluoxetine	712
Salicylates†	688
Tramadol	642
Mirtazapine	556
* Excludes compound analgesics (eg those containing paracetamol and codeine)	
† Includes aspirin	

TABLE 3.5 Household agents: top TOXBASE accesses in 2009/10

Agent	Number of accesses
Surfactants plus detergents (e.g. washing powders, washing-up liquids and fabric cleaning liquid tablets)	26,812
Bleaches	16,854
Isopropanol (e.g. hand gels and screenwashes)	2,931
Anti-freeze and de-icers	2,504
Silica gel	2,408
Batteries	2,232
Petroleum distillates	2,008
White spirit (e.g. paints and varnishes)	1,633
Descalers	1,529
Cyanoacrylate (e.g. glues)	1,496

TABLE 3.4 Pharmaceutical agents: top TOXBASE accesses by UK, Republic of Ireland and overseas users in 2009/10

UK			Republic of Ireland		Overseas	
Rank	Agent	Number of accesses (% of total)	Agent	Number of accesses (% of total)	Agent	Number of accesses (% of total)
1	Paracetamol*	71,652 (6.3%)	Paracetamol*	1,810 (6.6%)	Paracetamol*	615 (3.6%)
2	Ibuprofen	42,726 (3.7%)	Ibuprofen	888 (3.2%)	Ibuprofen	325 (1.9%)
3	Codeine†	25,573 (2.2%)	Codeine†	731 (2.7%)	Quetiapine	273 (1.6%)
4	Salicylates‡	25,452 (2.2%)	Diazepam	690 (2.5%)	Carbamazepine	268 (1.6%)
5	Citalopram	22,483 (2%)	Salicylates‡	619 (2.3%)	Amitriptyline	263 (1.5%)
6	Diazepam	20,646 (1.8%)	Zopiclone	604 (2.2%)	Salicylates†	242 (1.4%)
7	Fluoxetine	18,227 (1.6%)	Escitalopram	520 (1.9%)	Sertraline	212 (1.2%)
8	Zopiclone	17,092 (1.5%)	Venlafaxine	509 (1.9%)	Venlafaxine	212 (1.2%)
9	Tramadol	12,435 (1%)	Alprazolam	440 (1.6%)	Diazepam	208 (1.2%)
10	Amitriptyline	11,837 (1%)	Quetiapine	374 (1.4%)	Fluoxetine	208 (1.2%)
* Excludes compound analgesics containing paracetamol and codeine						
† Includes all codeine-containing products						
‡ Includes aspirin						



## 3.2 Consultant Referrals

### Background

Since May 2005, the NPIS has operated a national consultant clinical toxicology on-call rota. Currently eleven consultant clinical toxicologists from the four units (Birmingham, Cardiff, Edinburgh and Newcastle) participate, as well as three consultants from hospitals in London and York, who also contribute to out-of-hours cover (18.00 to 09.00, Monday to Thursday, weekends and public holidays) for the UK and the Republic of Ireland. All staff on the rota are involved in the care for poisoned patients in their own local NHS poisons treatment facilities. A nationally agreed protocol is used to determine when specialists in poisons information (SPIs) should refer enquiries to a consultant. The national rota is managed from NPIS Edinburgh.

For daytime cover, units continue to make local arrangements and may be supported by consultants, academic clinical staff and specialist registrars (SpRs) who are not on the UK NPIS consultant toxicologist rota, but all enquiries are answered under the supervision of NPIS consultants. NPIS Edinburgh also provides consultant support for Northern Ireland enquiries during the working week. Units provide cross-cover in emergencies and occasionally, in a planned

manner, support colleagues in special circumstances during the working week.

For telephone enquiries details of the original call are available on the UKPID central server for audit and checking, and the call reference number is sent to the relevant consultant for audit purposes. In addition, consultants keep contemporaneous local records of advice given, which are passed to the NPIS unit that took the original call for addition to the call record.

For the purposes of collating and auditing consultant referrals, NPIS Cardiff provides a monthly spreadsheet of enquiries that were referred to a consultant. Data on day and month, source and agents are given below.

### Referrals

There were 1245 referrals made to the consultant rotas (daytime and out-of-hours) in 2009/10, a 15% decrease on 2008/09. Figure 3.6 shows referrals by month since April 2006.

The distribution by day of the week is shown in Figure 3.7, with fewer consultant referrals at the weekend. The average number of referrals per day was 3.4 (the range is 0–13 referrals). Table 3.6 shows consultant referrals by country.

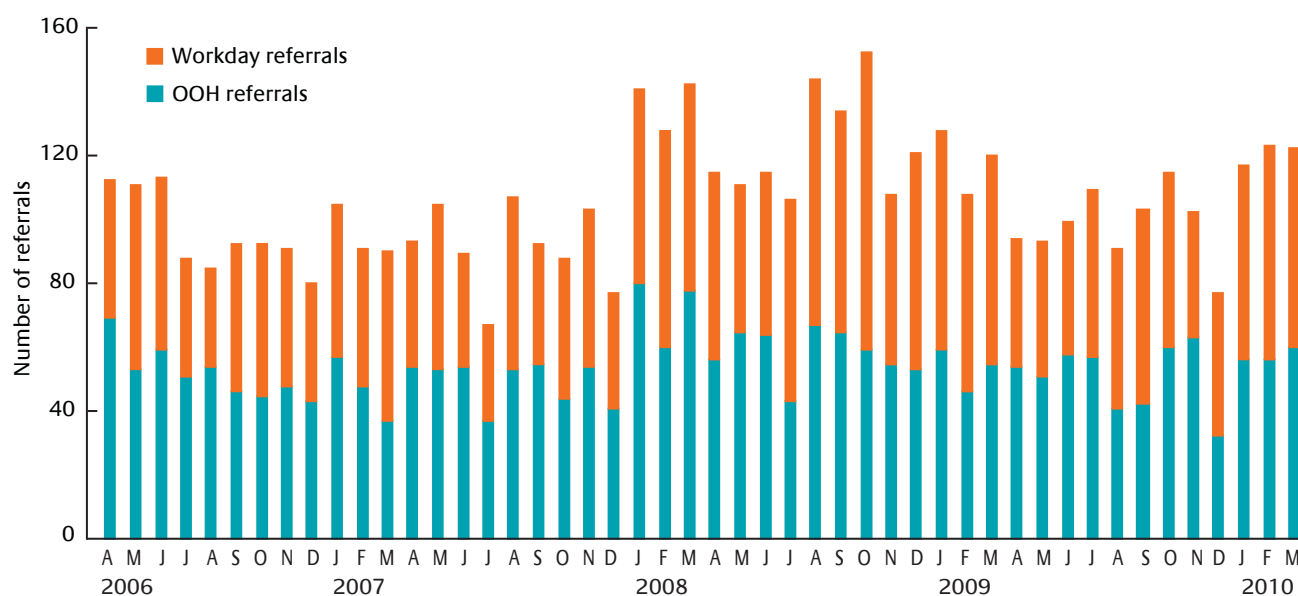


FIGURE 3.6 Monthly NPIS consultant referrals (including out-of-hours and workday referrals) since April 2006

TABLE 3.6 NPIS consultant referrals by country in 2009/10, with 2008/09 for comparison

Country	Number of referrals	Rate per 100,000 population*	% 2009/10	% 2008/09
England	911	1.8	73.2	72.4
Scotland	197	3.8	15.8	19.0
Wales	86	2.9	6.9	5.9
Northern Ireland	20	1.1	1.6	1.0
Republic of Ireland	22	–	1.8	1.3
Other	9	–	0.7	0.5
<b>Total</b>	<b>1245</b>			

\* Based on 2008 estimates from [www.statistics.gov.uk](http://www.statistics.gov.uk), accessed June 2010

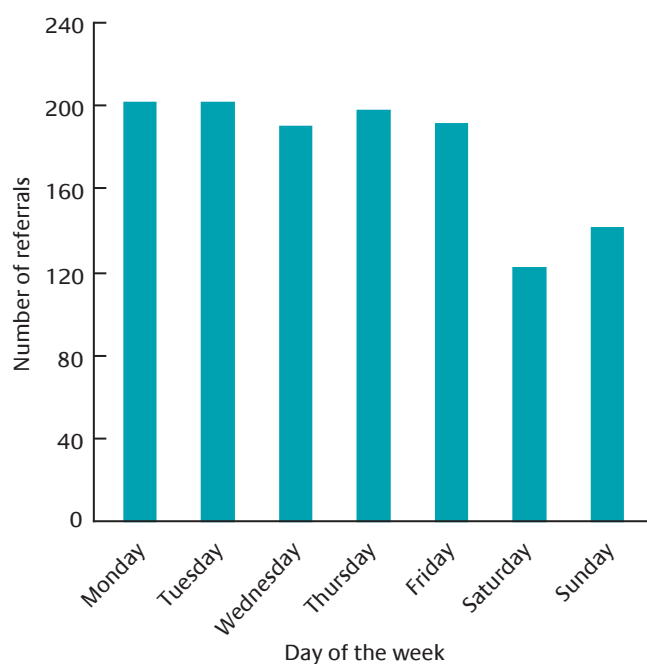


FIGURE 3.7 NPIS consultant referrals in 2009/10 by day of the week

The vast majority of consultant referrals came from hospitals (1123 referrals or 90.2%), with GPs (70; 5.6%), NHS Direct/ NHS 24 (20; 1.6%) and others (31; 2.5%) making much smaller contributions. Hospital referrals by department are shown in Table 3.7. There was a slight increase in the proportion of referrals from units other than emergency departments, compared with previous years.

TABLE 3.7 NPIS consultant referrals from hospital by department in 2009/10 (where confirmed, 1092 referrals)

Source	Number of referrals	% of referrals
Emergency departments	430	39.4
HDU/ITU	232	21.2
Medical	105	9.6
Paediatric	100	9.2
Admissions/short stay/assessment	100	9.2
Pharmacy/MI	328	2.6
Surgery	15	1.4
Psychiatry	5	0.4
Others	77	7.0

Table 3.8 shows the most common types of products involved in referrals to consultants. These were paracetamol-containing products, cardiac drugs, substances of abuse, benzodiazepines and toxic alcohols or glycols (e.g. ethylene glycol/methanol/anti-freeze). In 75 referrals the product taken (if any) was unknown and help with diagnosis was required. Alcohol was involved in 92 consultant referrals.

TABLE 3.8 Agents commonly involved in NPIS consultant referrals in 2009/10

Product	Number of referrals
Paracetamol	202
Digoxin	47
Iron	44
Ibuprofen	39
Aspirin	36
Co-codamol	34
Ethylene glycol	31
Diazepam	27
Amitriptyline	23
Amlodipine	21

### Feedback into NPIS services

Analysis of the consultant referrals is used to improve the services offered by the NPIS. This includes additions and changes to TOXBASE entries that reflect user needs. Issues highlighted by such calls, especially those that are difficult or complex, are discussed further amongst NPIS staff by email or telephone, and difficult enquiries may be examined in more detail at one of the NPIS CPD meetings. This year CPD topics have included antidotes, recreational drug abuse and occupational exposures.

### Conclusions

The NPIS national out-of-hours on-call consultant rota continues to work well. Frequent contact by email and telephone, together with regular educational meetings, helps to ensure consistency of advice. Information gleaned from analysis of the enquiries has assisted in identifying toxicological and methodological problems, improving the clarity of TOXBASE entries and informing the need for research in a number of areas.

## 3.3 UKTIS

The UK Teratology Information Service (UKTIS) was established as part of NPIS Newcastle in 1995. It provides a national service on all aspects of the toxicity of drugs and chemicals in pregnancy. Information is provided to healthcare professionals by a telephone information service and also online through TOXBASE, which holds pregnancy summaries on maternal exposures to various drugs and chemicals, developed by UKTIS staff. To date, there are approximately 500 pregnancy monographs, 300 of which are available through TOXBASE.

UKTIS also provides advice on drug and chemical exposure during pregnancy on request to official organisations such as the Health Protection Agency, the Medicines and Healthcare products Regulatory Agency, the Commission for Human Medicines, the European Medicines Agency, the British National Formulary and the Neonatal Formulary.

UKTIS is a founder member of the European Network of Teratology Services (ENTIS) and works with the Organisation of Teratology Information Specialists (OTIS) in the USA and Canada. Together with ENTIS and OTIS, UKTIS collaborates and shares data, to try and prevent congenital malformations.

A further key role of UKTIS is to collect pregnancy outcome data from women who have been exposed to drugs and chemicals in pregnancy. These data contribute to provision of an individual risk assessment for a pregnant women exposed to drugs and chemicals, and preconception advice for men and women concerning drug and chemical exposures.

### Number and source of telephone enquiries

During 2009/10 UKTIS received 4213 pregnancy-related telephone enquiries, a decrease of less than 1% on the figure for 2008/09. The distribution of telephone enquiries taken by UKTIS in England, Scotland, Wales and Northern Ireland is shown in Table 3.9. In addition, UKTIS took 61 calls from outside the UK, the majority from the Republic of Ireland. A regional breakdown of calls taken in England is shown in Table 3.10.

TABLE 3.9 Distribution of telephone enquiries to UKTIS in 2009/10

Country	Number of enquiries	% of enquiries	Enquiries per million population*
England	3620	86	70.8
Scotland	270	6.4	52.5
Wales	208	4.9	69.9
Northern Ireland	54	1.3	30.7
Outside the UK, including the Republic of Ireland	61	1.4	N/A
<b>Total</b>	<b>4213</b>	<b>100</b>	

\* Based on 2008 estimates from [www.statistics.gov.uk](http://www.statistics.gov.uk)

TABLE 3.10 Regional distribution in England of telephone enquiries to UKTIS in 2009/10

UKMI region	Number of enquiries	% of enquiries
East Anglia	147	4
London – North Thames	579	16
London – South Thames	428	12
North East	441	12.2
North West	418	11.6
South Coast (Wessex)	250	7
South West	336	9.3
Trent	299	8.3
West Midlands	340	9.4
Yorkshire	367	10.2
<b>Total</b>	<b>3605</b>	<b>100</b>

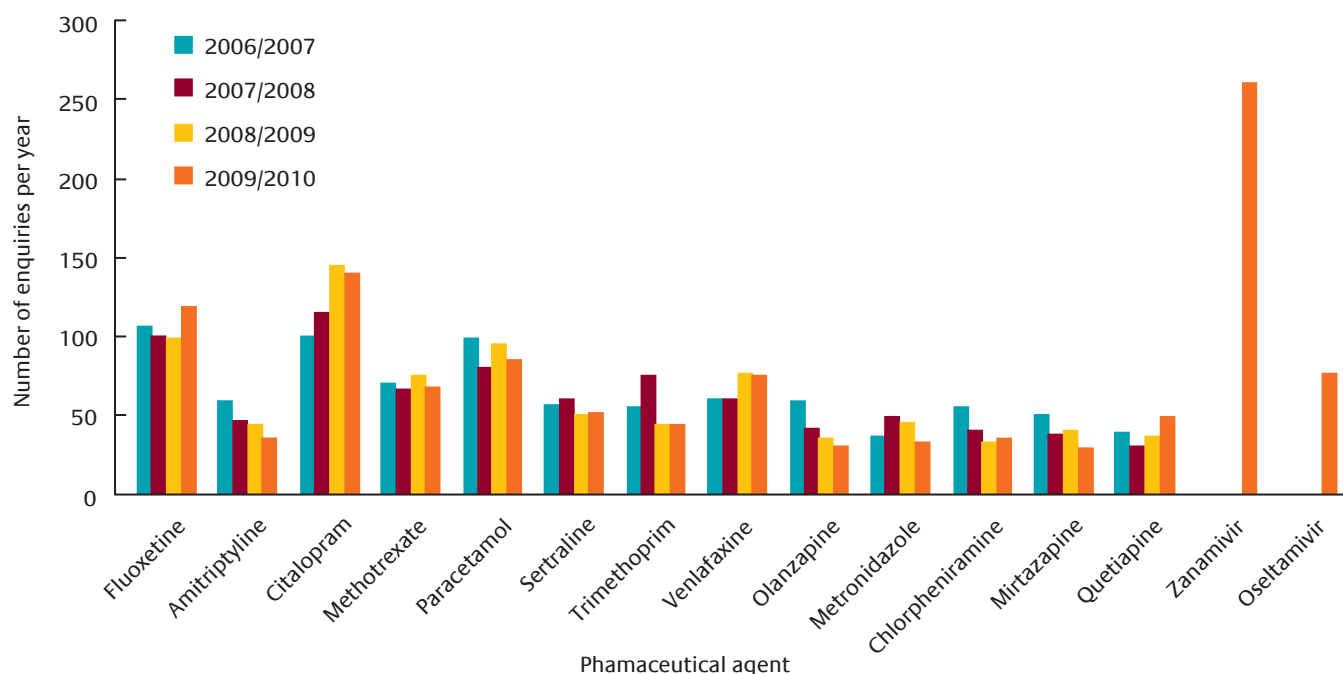


FIGURE 3.8 Top agents involved in telephone enquiries to UKTIS in the last four years, 2006/07 to 2009/10

The most frequent enquiry to UKTIS in 2009/10 was for patient information regarding zanamivir, the antiviral of choice in the UK for the prophylaxis and treatment of A/H1N1v influenza in pregnancy. UKTIS participated in the HPA emergency pandemic response plan by providing advice on swine flu

infection and/or treatment in pregnancy and collecting epidemiological data during the early stages of the first wave of the 2009 pandemic. The second and third most frequent enquiries in 2009/10 related to the use of the antidepressants citalopram and fluoxetine (Figure 3.8).

## Pregnancy summaries

To assist with enquiry answering, summary information has been written for a number of drugs and chemicals. The pregnancy summaries (monographs) hosted by the TOXBASE website had approximately 36,000 accesses during 2009/10, a slight increase compared with 2008/09 (Figure 3.9). These figures are in keeping with the trend of the past few years, which has shown a gradual decrease in telephone enquiries accompanied by a steady increase in TOXBASE use.

In 2009/10, 54 new and updated pregnancy monographs were added to TOXBASE (Table 3.11). Monographs produced

this year included information regarding maternal exposure to immunosuppressants, the beta adrenoceptor blocking drugs, influenza A/H1N1v vaccine and the antivirals zanamivir and oseltamivir.

The most frequently accessed documents were those relating to swine flu in pregnancy, with 4194 hits for the swine flu in pregnancy and antiviral (oseltamivir and zanamivir) documents. The next most accessed documents related to antibiotics (1815 hits) and nausea and vomiting (1472 hits) in pregnancy. The top 20 most accessed TOXBASE monographs for 2009/10 are listed in Table 3.12.

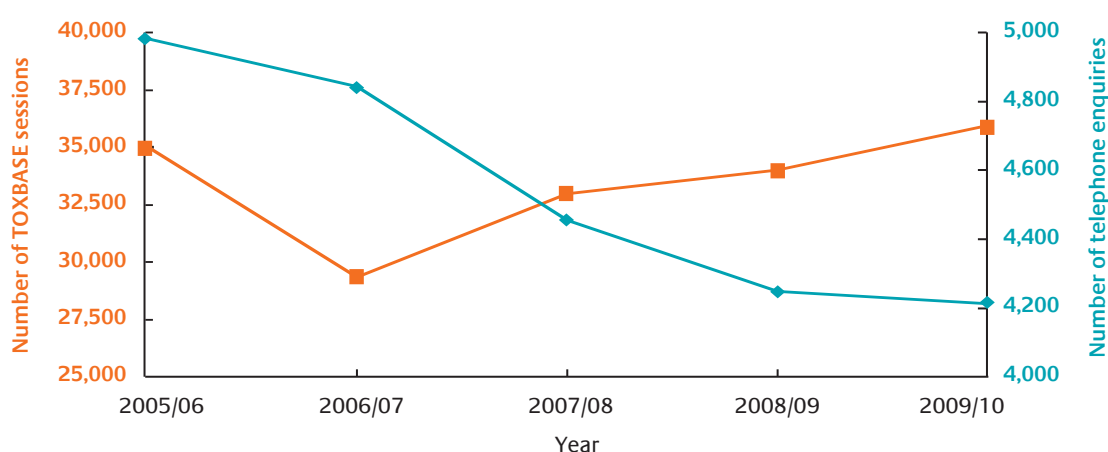


FIGURE 3.9 Telephone enquiries and TOXBASE sessions from 2006/07 to 2009/10

TABLE 3.11 Updated pregnancy-related monographs added to TOXBASE in 2009/10

Aciclovir	Erythromycin	Macrolides	Quetiapine
Adalimumab	Essential oils	Mebendazole	Quinolones
Ampicillin	Etanercept	Metoprolol	Ribavirin
Anthelmintics	Haloperidol	Mifepristone	Risperidone
Atenolol	H1N1 influenza vaccine	Mirtazapine	Rituximab
Azithromycin	Intrahepatic cholestasis	Montelukast nadolol	Sotalol
Baclofen	of pregnancy	Nausea and vomiting	Swine flu
Beta interferon	Infliximab	Nebivolol	Thalidomide
Bisoprolol	Influenza vaccine	Nitrofurantoin	Timolol
Celiprolol	Irbesartan	Olanzapine	Ursodeoxycholic acid
Cholestyramine	Labetalol	Oseltamivir	Yellow fever vaccine
Ciprofloxacin	Lithium	Oxprenolol	Zanamivir
Clozapine	Losartan	Podophyllin	Zolpidem
Doxycycline		Propranolol	

TABLE 3.12 Top 20 most accessed pregnancy summaries on TOXBASE in 2009/10

Pregnancy monograph	Number of accesses
Swine flu	1927
Antibiotics	1815
Nausea and vomiting	1472
Oseltamivir	1348
Zanamivir	919
Malaria prophylaxis	859
Citalopram	846
Codeine	835
Amitriptyline	706
Chlorphenamine	624
Corticosteroids	611
Antidepressants and neonatal withdrawal	600
Migraine	550
Gabapentin	538
Cetirizine	517
Atenolol	497
Trimethoprim	488
Doxycycline	472
Metronidazole	472
Antispasmodics	452

UKTIS summary sections of updated or new pregnancy monographs continue to be hosted by the National electronic Library for Medicines website ([www.nelm.nhs.uk](http://www.nelm.nhs.uk)). These summaries are freely accessible over the internet with instructions to link to TOXBASE for access to the complete monographs. Alerts are sent to registered NHS users by email when any new or updated pregnancy summary is published.

### Nature of telephone enquiries

Of the 4213 enquiries to UKTIS during 2009/10, 3430 (81%) concerned maternal pregnancy exposures. The majority of calls (43%) were regarding pregnant women who had

already been exposed to a drug or chemical, whilst 27% were regarding preprescription enquiries. Around 14% of enquiries were made regarding general information on drug and chemical exposures in pregnancy. Information for women who were planning pregnancy, but not yet pregnant, made up 10% of all the enquiries to UKTIS in this financial year (Figure 3.10). Hospital pharmacists (41%) remain the most frequent type of caller, followed by GPs (25%), consultants (7%) and community pharmacists (6%) (Figure 3.11). Therapeutic use of medicines during pregnancy remains the largest category about which enquiries are made (90%) (Table 3.13).

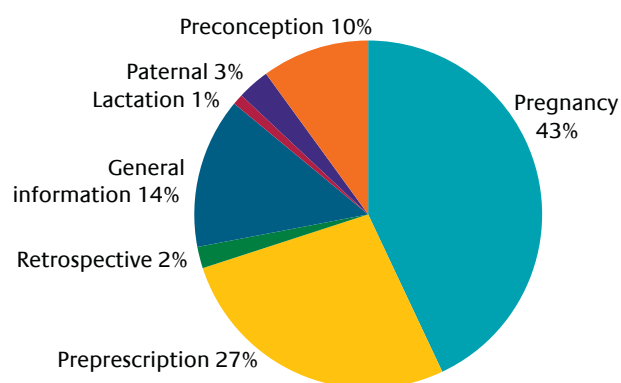


FIGURE 3.10 Telephone enquiries to UKTIS by category of exposure in 2009/10

TABLE 3.13 Telephone enquiries to UKTIS by type of exposure in 2009/10

Type of exposure	Number of enquiries	% of enquiries
Therapeutic	3786	90
Drug overdose	116	2.7
Poisoning	142	3.4
Substance abuse	23	0.5
Complementary medicines	11	0.3
Occupational	45	1.1
Environmental	38	0.9
Miscellaneous	52	1.2
<b>Total</b>	<b>4213</b>	<b>100</b>



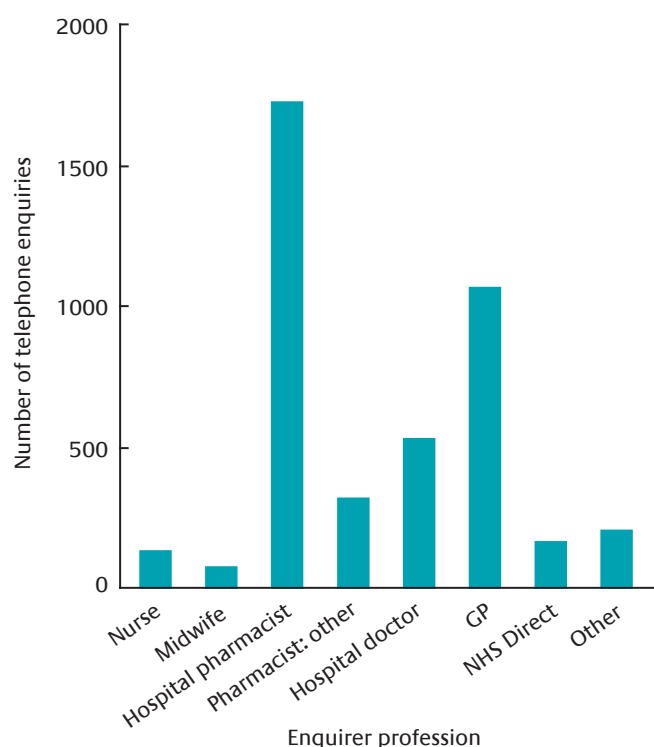


FIGURE 3.11 Telephone enquiries to UKTIS by type of caller in 2009/10

## Pregnancy follow-up and outcomes

Limited data exist on the potential fetotoxicity of drug and chemical exposures in pregnancy. UKTIS therefore attempts to obtain pregnancy outcome details for all enquiries where sufficient patient identification is provided. In the financial year 2009/10, UKTIS attempted to follow up 2223 (53%) of enquiries made to the service. A large number of these pregnancies are still ongoing, but we have already received the outcome for 462 pregnancies. A further 116 women were lost to follow-up, 13 were found to be not pregnant and 61 were ultimately not exposed to the drug about which their healthcare professional had enquired.

## Teaching and training

UKTIS has continued to provide training in teratology-related subjects to undergraduate and postgraduate students at a national level. Training was provided externally for the Drug and Safety Research Unit in Southampton and also for the Royal College of Obstetricians and Gynaecologists during

2009/10. UKTIS also hosted a 'Medication in Pregnancy' workshop at the annual UKMi conference held in Edinburgh in 2009.

In 2009/10, eight new staff members within NPIS Newcastle and UKTIS were trained to answer teratology enquiries. Training material for teaching purposes has continuously been updated throughout the year to reflect new published data and evidence. A full day of in-house critical appraisal training was also provided by UKTIS for a number of UKTIS and NPIS Newcastle specialists.

## UKTIS pregnancy outcome data from routine surveillance activity

UKTIS has been proactive in producing abstracts for various regional, national and international conferences. UKTIS data on cannabis, hepatitis A and B vaccines, trichloroethylene, aspirin overdose and A/H1N1v influenza were presented at conferences throughout 2009/10. Abstracts have already been prepared and accepted for meetings in 2010/11 to include data on maternal exposure to diazepam overdose, ibuprofen overdose in the third trimester, and mifepristone in pregnancy.

## Service developments in 2009/10

### Appointment of new head of teratology

Dr Laura Yates was successfully appointed as the new head of UKTIS and Consultant in Clinical Genetics in Autumn 2009.

### Software development

The development of new software suitable for logging pregnancy enquiries and to house legacy outcome data continued throughout 2009/10. This new state-of-the-art software will allow for more efficient logging, checking and follow-up of pregnancy enquiries, and will enable the generation of automated reports on all exposures, improving UKTIS surveillance of potential teratogens. The new database went live in the latter half of 2010. To date, all UKTIS legacy data have been successfully migrated into the new system and this part of the system is now up and running and working successfully.

## UKTIS website

This year also saw the launch of the UKTIS website. This aims to promote the service, provide contact details, and to provide access for healthcare professionals to reporting forms for both routine enquiries and for UKTIS studies (Figure 3.12). The website has been an invaluable tool to advertise the NIHR A/H1N1v Influenza in Pregnancy Study and to provide healthcare professionals and participants with forms and information about the study. To date, [www.UKTIS.org](http://www.UKTIS.org) has received just over 83,000 hits.

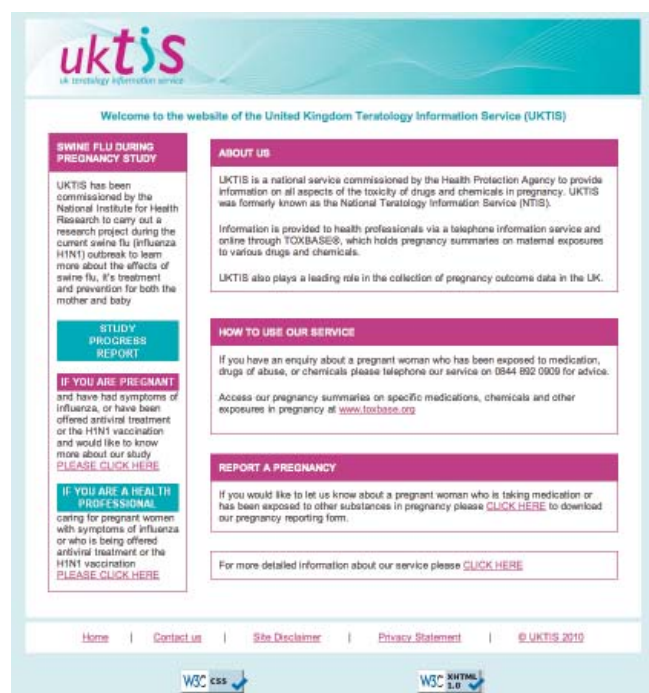


FIGURE 3.12 UKTIS website home page during 2009/10

## 3.4 Product Data Centre

Many accidental and deliberate poisonings occur from exposure to consumer products. In order for the NPIS to provide accurate advice on the treatment and management of such patients, reliable information on the composition of consumer products is necessary. Manufacturers' product datasheets ('Material Safety Data Sheets', MSDS) also provide information for updating TOXBASE, enabling end-users to obtain specific advice on many common products.

NPIS Birmingham has the responsibility of providing product data on pesticides and herbicides to all the NPIS units and liaises with manufacturers to ensure that the data held are comprehensive and up-to-date. In 2009/10, 6506 MSDS were added to the NPIS Product Data Centre which now holds 56,632 MSDS. The database is indexed by product name, manufacturer, date of MSDS, and the accession date for the MSDS to the database.

In practice, the most common search undertaken by NPIS staff of the Product Data Centre is by product name (full or partial name) and/or by manufacturer, which is the information usually available at the time of the NPIS enquiry. The date of the MSDS can differentiate between information on updated formulations. Where these fields are insufficient, the database is also fully text searchable, which enables searches to be made on any other criteria, e.g. active ingredients or use.

NPIS Birmingham has developed a database to support the Product Data Centre. This second database holds contact details for more than 2200 companies and assists in the tracking of correspondence with companies. It also includes data on the current marketing status of products such as pesticides.

## 3.5 Current Awareness

To ensure that NPIS staff are equipped to answer enquiries on all aspects of human toxicology and that TOXBASE is kept up-to-date, access to current scientific literature is essential. With the assistance of the other NPIS units, NPIS Birmingham produces *Current Awareness in Clinical Toxicology* each month. Each issue lists some 300 citations, with around 12–16 key papers highlighted because of their importance to the clinical management of poisoning. In the digital version, 84% of the citations have abstracts. Citations are selected using searches specially developed for the purpose run against Medline, Embase and Science Direct. In addition, the tables of contents of key journals are scanned for suitable papers on publication.

*Current Awareness* is distributed electronically or in hard copy to all the NPIS units and can be used to produce citations for scientific papers employing any reference style. In addition, the American Academy of Clinical Toxicology (AACT), the European Association of Poisons Centres and Clinical Toxicologists (EAPCCT) and the Asia Pacific Association of Medical Toxicology (APAMT) distribute *Current Awareness* to their members worldwide.

All citations in *Current Awareness* are added to a literature database, which currently contains 71,000 references. The database is fully searchable using keywords, authors, journals and text words.

## 4 Areas of Interest in 2009/10

This chapter includes a selection of activities conducted by the NPIS and reports on poisons that have specific aspects that may be of interest.

### 4.1 Household Products

The NPIS receives many enquiries related to possible exposures to household products. Recently, for a prospective study, the NPIS units collected 5939 consecutive enquiries relating to 6086 household cleaning products received from UK physicians and other healthcare workers over a 14-month period. Where possible, to determine outcome, each enquiry was followed up by telephone within four hours to ensure that the maximum data were obtained.

The majority of enquiries (65%) concerned children of five years of age or less (Figure 4.1) and were received predominantly from hospitals (32%), general practitioners (30%) and NHS Direct/NHS 24 (28%).

The vast majority of exposures occurred at home (98%), with less than 1% occurring at work. Most exposures were

accidental (94%). Exposure was acute (<2 hours) in 99% of cases; staggered (2 – 24 hours) in 0.2% of cases, 0.4% of cases were sub-acute (24 hours – <1 month), and 0.3% were chronic (>1 month).

Table 4.1 shows the top 20 common products to which patients were exposed; more details on exposures to fabric cleaning liquid tablets are provided below. Intentional exposures were more likely to involve bleaches, multipurpose cleaners and disinfectant/antiseptic/sanitiser liquids (Table 4.2).

Exposure to household products occurred mainly as a result of ingestion (76%), with eye contact (8%), inhalation (7%) and skin contact (3%) being less common; 5% of enquiries involved multiple routes of exposure.

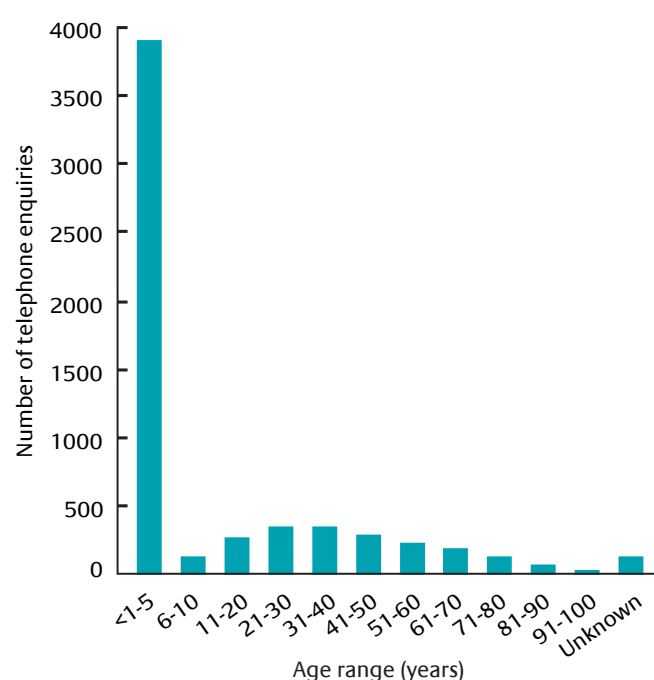


FIGURE 4.1 Age range of patients involved in telephone enquiries related to household products in 2009/10

TABLE 4.1 Type of product involved in telephone enquiries related to household products in 2009/10

Product	Number of enquiries
Fabric cleaning liquid tablets	647
Bleach	473
Multipurpose cleaner	408
Descaler	397
Disinfectant/antiseptic/sanitiser liquid	270
Plug ins liquid	206
Dishwasher tablet	201
Toilet cleaner/freshener liquid	156
Washing up liquid	130
Prewash stain remover	116
Rinse aid	112
Biocidal hand cleanser (domestic use)	104
Fabric cleaning powder tablet	102
Floor cleaner	101
Bathroom/bath cleaner	100
Toilet cleaner/freshener solid/powder	99
Fabric cleaning powder	95
Fabric cleaning liquid	94
Toilet rim block	80
Insect control powder (domestic use)	79

TABLE 4.2 Intentional exposures involved in telephone enquiries related to household products in 2009/10

Product	Number of enquiries
Bleach	88
Multipurpose cleaner	31
Disinfectant/antiseptic/sanitiser liquid	28
Toilet cleaner/freshener liquid	22
Bathroom/bath cleaner	11
Floor cleaner	11
Screenwash	11
Window/glass cleaner liquid	10
Fabric conditioner liquid	6
Washing up liquid	6
Descaler	5
Kitchen cleaner	5

Common features that developed following exposure to a household product(s), and which were present at the time of the enquiry, are shown in Table 4.3. In 5840 of 5939 enquiries the poisoning severity score\* was known at the time of the enquiry. The majority of patients (70%) were asymptomatic, but 1635 patients developed minor, 75 moderate and ten patients serious features, two of whom died (see below).

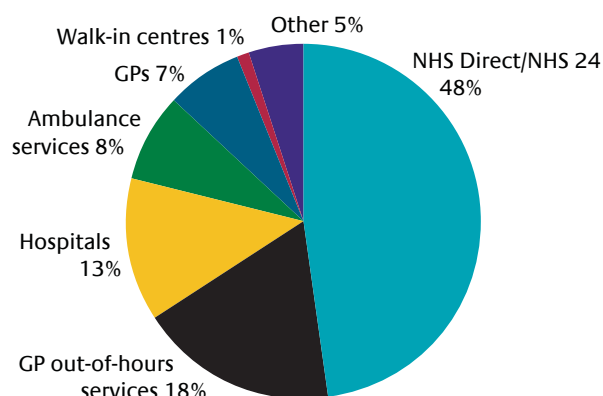
## Follow-up and outcome

Of the 5939 enquiries, 3403 were not or could not be followed up. These are shown by source of enquiry in Figure 4.2. Follow-up of the enquiries received from NHS Direct/NHS 24, GP out-of-hours services, walk-in centres and ambulance services (some 75% of all enquiries that could not be followed up) was not usually attempted, as the enquirers do not routinely collect follow-up data.

\* Persson HE, Sjöberg GK, Haines JA, Pronczuk de Garbino J. Poisoning severity score. Grading of acute poisoning. J Toxicol Clin Toxicol 1998; 36: 205–13.

TABLE 4.3 Features present at the time of the telephone enquiries related to household products in 2009/10

Features	Number of enquiries
<b><i>Skin contact</i></b>	
Chemical burn/ulcer	47
Rash	21
Skin reaction	16
Skin irritation	16
Bullous eruption	13
Paraesthesiae	9
<b><i>Eye contact</i></b>	
Eye pain	137
Eye irritation	106
Conjunctivitis	84
Increased lacrimation	11
Abnormal vision	7
Chemical burn to the eye	7
Corneal ulceration/abrasion/opacity	7
<b><i>Inhalation</i></b>	
Dyspnoea/bronchospasm	75
Cough	54
Chest pain	51
Pharyngitis/laryngitis	48
Nausea/vomiting	28
Headache	24
<b><i>Ingestion</i></b>	
Vomiting	333
Pharyngitis/laryngitis/throat irritation/stomatitis	132
Nausea	113
Abdominal pain	112
Cough	74
Diarrhoea	42
Drowsiness and coma	35
Haematemesis	12



**FIGURE 4.2** Source of telephone enquiries related to household products in 2009/10, where follow-up data are not available

Follow-up data were available in 2536 cases, of which the majority (70%) are known to have made a full recovery. The outcome is unknown in 26% of cases where follow-up was attempted but not obtained due to the patient self-discharging, the enquirer going off duty, or the patient being transferred to a different hospital/ward. Eighty-one patients developed complications of exposure and two patients, both adults, died, probably due to self-harm.

## Fabric cleaning liquid tablets

Historically laundry detergents were available as powders or as liquids intended to be poured into a washing machine or dispenser. More recently, washing sachets, sometimes referred to as 'liquitabs', have become available. These sachets contain a liquid washing agent within a flexible container and are intended to be placed directly into the drum of a washing machine. Upon contact with water the flexible sachet breaks down releasing the contents.

Whilst these sachets are mechanically strong when dry, they can release their contents prematurely when they come into contact with moisture – for example, from water or a moist hand. Their contents are irritant and concern has been raised about their ability to cause local damage, especially damage to the eyes. In addition, some cases of children exposed to the contents of these sachets had been reported to the NPIS as having developed central nervous system depression

unexpectedly. In total, 3979 TOXBASE accesses were made during 2009/10. This is an increase over the previous year's total of 3164, and more than double the number of accesses for these products five years ago.

In the prospective study of household cleaning product enquiries mentioned above, fabric cleaning liquid tablets were the most common product to which patients were exposed (647 enquiries). These exposures occurred most commonly as a result of ingestion (80%), with eye contact (10%) and skin contact (1%) being less frequent; 9% of enquiries involved multiple routes of exposure. The majority of enquiries (96%) concerned children of five years of age or less.

The eye was involved in 102 patients (106 enquiries); eye contact was the sole route of exposure in 60 of these patients and 92% were children aged five years or less. Features that developed following ocular exposure were conjunctivitis (34 cases), which was associated with eye pain in eight cases; eye irritation (16 cases); eye pain (21 cases); increased lacrimation (four cases); corneal ulceration (three cases), which was still present in one patient nine days after exposure; and blurred vision (two cases). In 28 cases no features were recorded. We attempted to follow up all these enquiries and to the best of our knowledge all ocular damage resolved.

Because of concerns about the ability to cause serious eye injury, and because of reports of central nervous system depression, a customised form and warning was placed on TOXBASE and users were asked to report cases electronically. During the year, 28 forms were returned. Of these, 27 concerned children aged five years or less; 18 cases involved ingestion, 12 eye exposure and three skin exposure. Of the 18 forms involving ingestion, eight reported features of central nervous system depression (with signs of sedation).

Exposure to the contents of these sachets is a matter of concern due to their potential to cause eye damage and because of the reports of central nervous system depression following ingestion. Greater consumer awareness is required to reduce injuries of this kind. Parents also have a vital role to play in ensuring that these products are stored safely at all times.



## 4.2 Drugs of Misuse

In previous years the NPIS has provided information about telephone enquiries and accesses to TOXBASE relating to selected drugs of misuse. This section provides a brief update on trends in activity.

The major change in NPIS workload during 2009/10 has been the substantial increase in the numbers of telephone enquiries and TOXBASE accesses relating to cathinones, especially mephedrone (Figures 4.3 and 4.4). This drug was rarely involved in NPIS enquiries prior to this year, but during 2009/10 was the most common recreational drug involved in NPIS

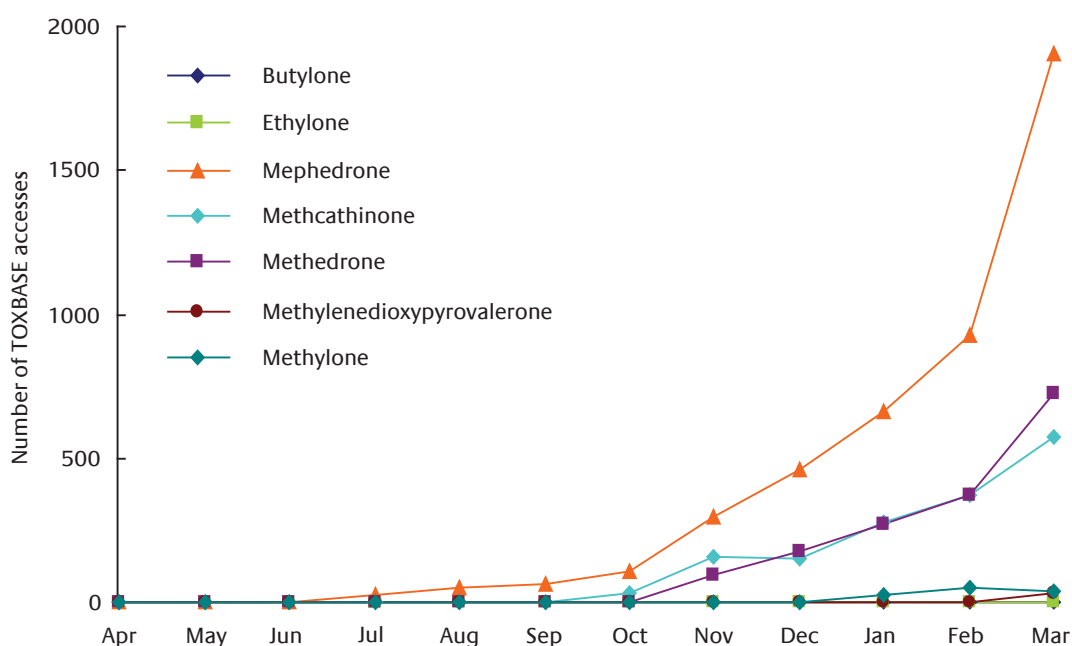


FIGURE 4.3 TOXBASE accesses relating to selected cathinones made each month in 2009/10

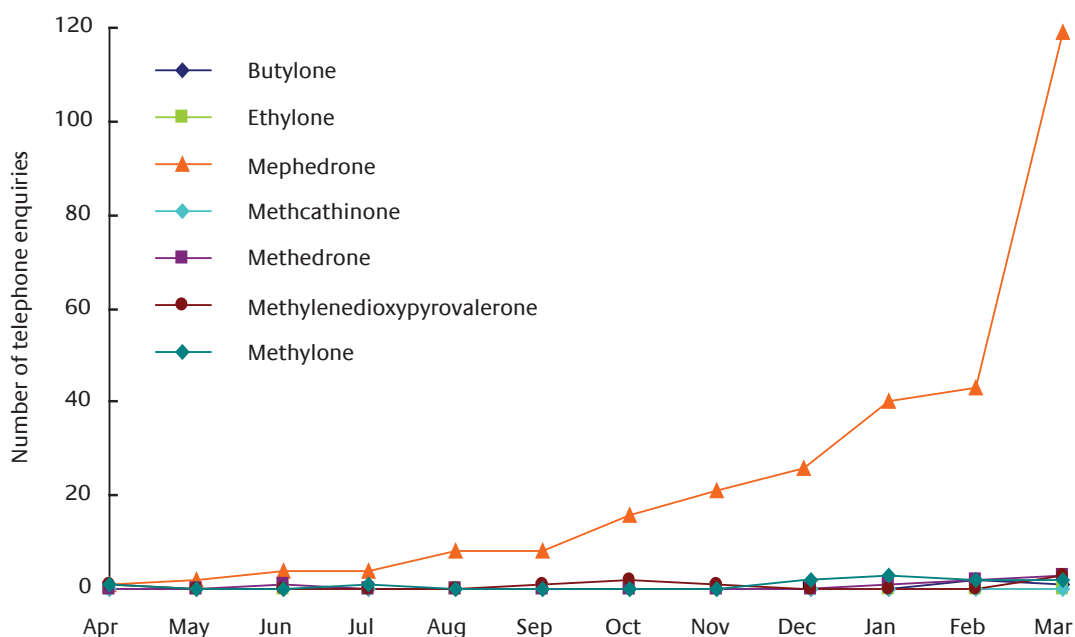


FIGURE 4.4 Telephone enquiries relating to selected cathinones made each month in 2009/10

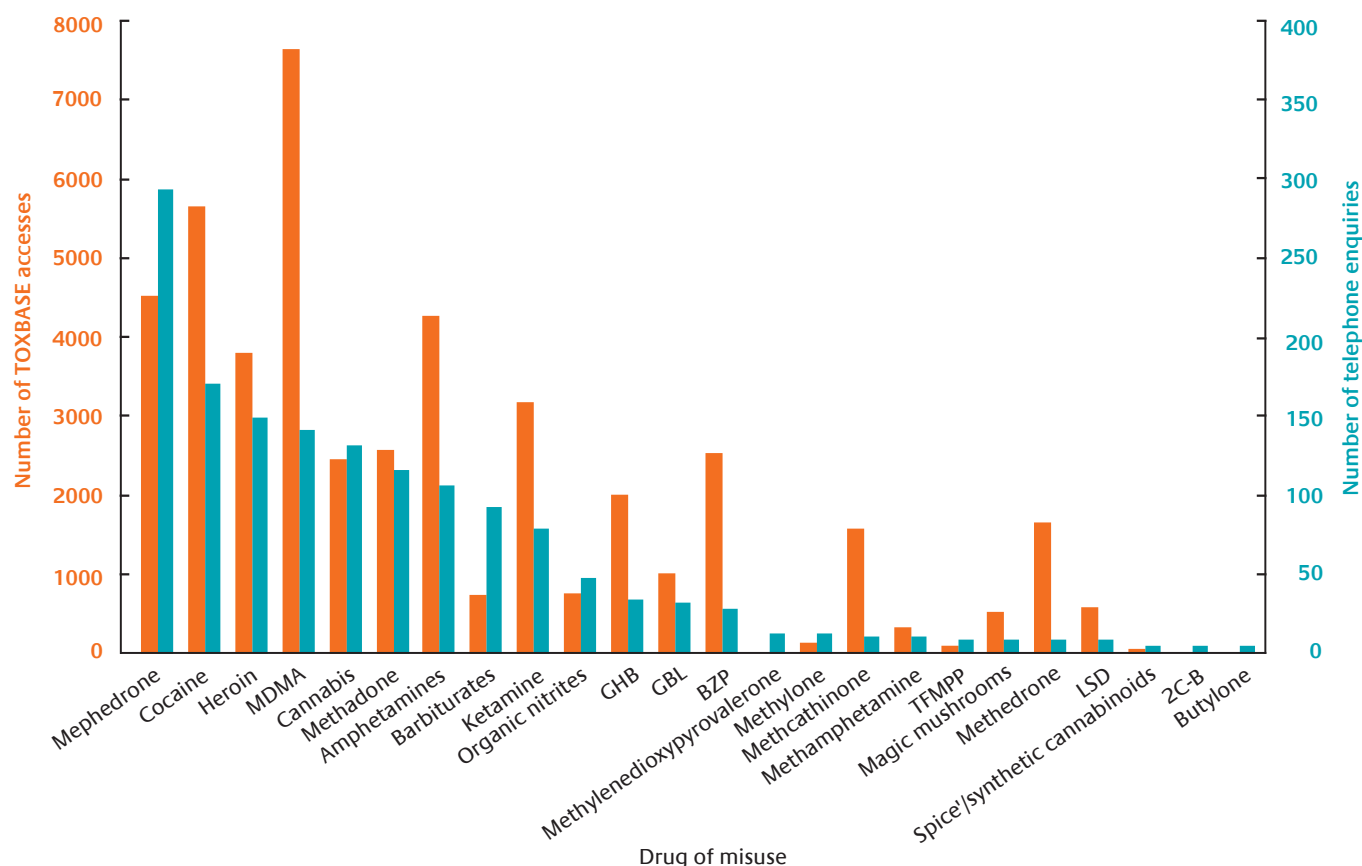


FIGURE 4.5 Telephone enquiries and TOXBASE accesses relating to selected drugs of misuse in 2009/10

telephone enquiries and the third most commonly involved in TOXBASE accesses (Figure 4.5). Enquiries relating to other cathinones, including methylenedioxypropylvalerone (MDPV), methylone, methcathinone, methedrone and butylone, were less frequent. These drugs are recreational stimulants similar in structure and clinical effects to amphetamines. During 2009/10 cathinones were not controlled under misuse of drug regulations\*, and were freely available and inexpensive for purchase from shops and over the internet.

The NPIS has also been monitoring enquiries relating to other newer stimulants, including TFMPP and 2C-B. These agents continue to account for a very small proportion of all enquiries (Figure 4.5).

\* Mephedrone and many other cathinones were classified under the Misuse of Drugs Act as Class B controlled drugs in April 2010.

Longer term trends are presented as proportions of the total numbers of calls received or TOXBASE accesses made each year. This adjustment is needed to take into account increases in overall TOXBASE accesses and reductions in telephone enquiries that have occurred over the years.

Activity relating to cocaine had been increasing, as indicated in previous annual reports, but has reduced in the last year. One reason may be users switching to other stimulants, especially mephedrone. There has also been a reduction in telephone enquiries for MDMA and other amphetamines in recent years, although TOXBASE activity has not reduced (Figures 4.6 and 4.7).

Increases in activity have also been observed for ketamine, GBL and benzylpiperazines (BZP), although enquiries relating to these substances remain less common. The proportion of NPIS activity relating to heroin and LSD has declined (Figures 4.6 and 4.7).

NPIS data on drugs of misuse continue to be used to help inform policy. During the year reports have been provided by the NPIS to the Advisory Council on Misuse of Drugs about

cathinones and organic nitrites ('poppers'). Mephedrone enquiry statistics have also been provided to the European Monitoring Centre for Drugs and Drug Addiction.

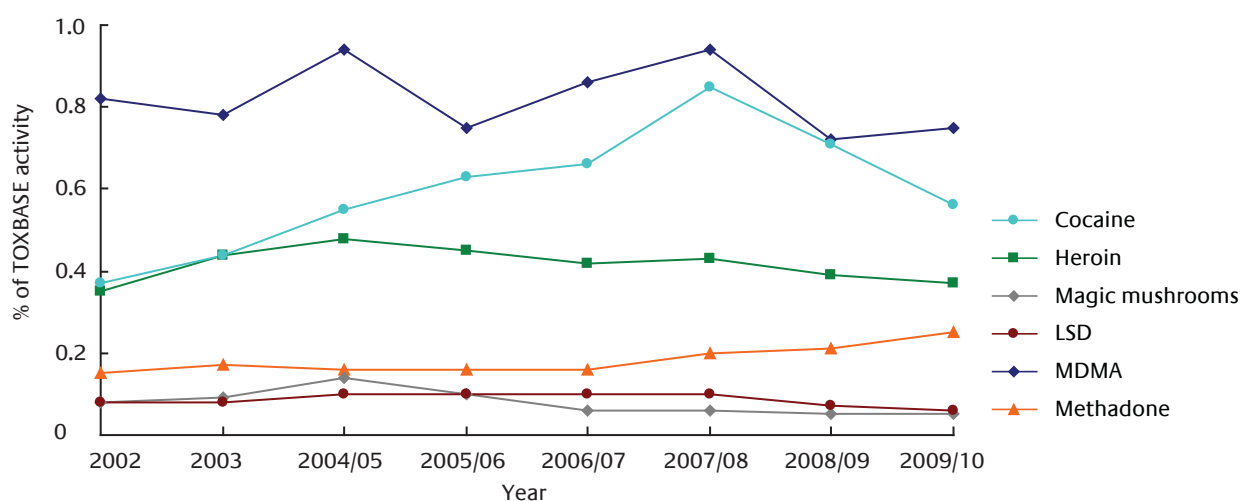


FIGURE 4.6 TOXBASE sessions relating to selected Class A drugs of misuse (data for 2002–2003 by calendar year; subsequent data by financial year)

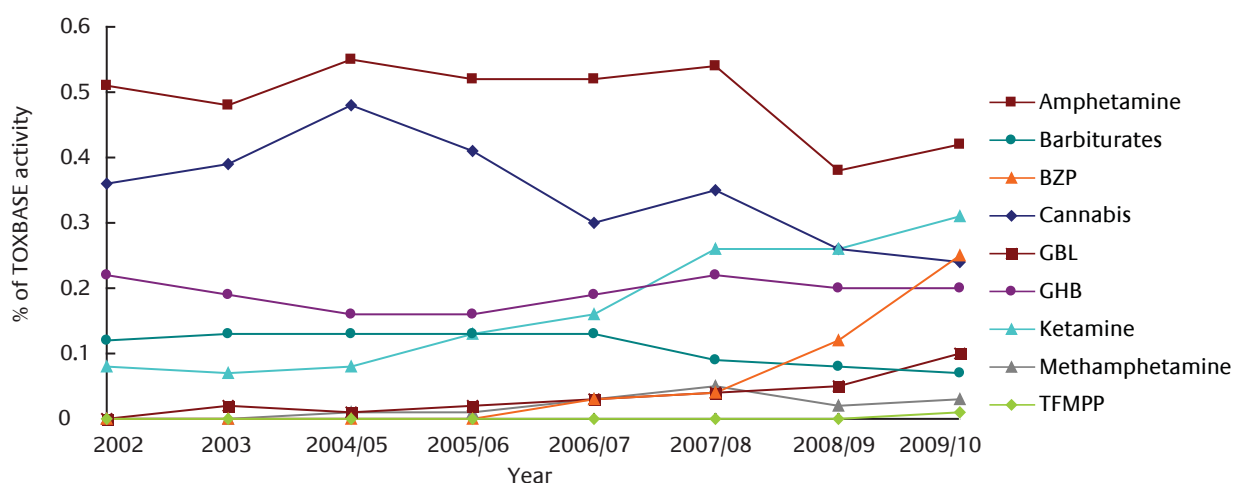


FIGURE 4.7 TOXBASE sessions relating to selected drugs of misuse other than Class A drugs (data for 2002–2003 by calendar year; subsequent data by financial year)

## 4.3 Pesticide Poisonings

In previous years the NPIS report has provided detailed data on pesticide exposures. This year we are concentrating on severe cases. During 2009/10, 497 telephone enquiries involving pesticides were reported to the NPIS. Of these, 13 (3%), were graded as severe by the NPIS using the poisoning severity score, or were fatal.

Four exposures were reported to result in death. These patients were all adults (two male). Three exposures were due to deliberate self-harm. One case was accidental and related to unsafe storage of a herbicide. All but one of these deaths was associated with herbicides, one being related to the withdrawn product paraquat. One case related to exposure to an organophosphate pesticide.

Nine severe cases were reported. Of these, the majority were adults (eight cases). Eight patients were male. In contrast to deaths, only three of the severe exposures were due to deliberate self-harm and six were accidental.

The three cases of deliberate self-harm exposures involved herbicides or organophosphate pesticide. The six accidental exposures involved amitraz, endosulfan, organophosphate (unspecified), paraquat, phostoxin with chlorpyrifos, and wood preservative.

One accidental exposure was occupational and occurred while the product was in use by the patient. Two exposures took place as a consequence of application but not at the time of use, one was due to unsatisfactory storage and one exposure was an alleged malicious poisoning by a third party. In one case the circumstances were unknown and the enquirer was trying to rule out pesticide exposure in a brain-damaged patient.

As in previous reports the majority of pesticide exposures reported to the NPIS are accidental and appear to cause little in the way of ill-health.

## 4.4 Quinine Poisonings

Quinine is used extensively in the UK for the management of leg cramps, although its efficacy is generally thought to be limited. The MHRA recently issued a caution on its use\*.

The main concerns in overdose are the high toxicity of this agent, particularly in children, and its association with blindness and cardiac arrhythmia.

Telephone enquiries to the NPIS are logged on the UKPID system. It has been possible to search this systematically across all units since 2008. In 2008/09, the NPIS was contacted for information on 126 cases relating to quinine toxicity. In 2009/10 the number of incidents rose slightly to 133 cases.

When the data for both years are considered together, 173 (around 70%) of enquiries involved patients ingesting quinine alone (or combined with alcohol). Accidental exposures were documented in 34 cases, 119 cases were reported as therapeutic errors resulting in excess quinine ingestion, and 97 cases were documented as deliberate self-harm acts.

During these two years, 37 cases exhibited cardiac symptoms, 32 cases developed visual symptoms and 29 cases presented hearing disturbances. Visual disturbances were a more common complication in those under 50 years of age, but the majority of exposures were in those over 50. This is the age group for which quinine is prescribed. This illustrates the problem that arises when quinine is taken as a self-harm action, often by those not normally prescribed the drug. It is difficult to predict outcome in quinine poisoning, and visual loss may vary from complete blindness to various degrees of visual field loss which is permanent. In 2009/10 there were two deaths reported to the NPIS in which quinine was a component of an overdose in an act of self-harm.

The NPIS would encourage physicians to follow MHRA advice in limiting prescription to those who benefit and warning of the risks of accidental exposures in children and younger adults.

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\* Drug Safety Update Volume 3, Issue 11, June 2010: [www.mhra.gov.uk/Publications/Safetyguidance/DrugSafetyUpdate/CON084655](http://www.mhra.gov.uk/Publications/Safetyguidance/DrugSafetyUpdate/CON084655), accessed June 2010

## 4.5 Tricyclic Antidepressants

Antidepressants are commonly prescribed within the UK. They offer the opportunity to treat a potentially devastating and life-threatening illness, but also offer a potential source of harm to patients who may wish to harm themselves due to their depression.

Some antidepressants are more toxic in overdose than others. For example, the tricyclic group of antidepressants (TCAs) and other related antidepressants are considerably more toxic in overdose than selective serotonin reuptake inhibitors (SSRIs). Some cyclic antidepressants – for example, amitriptyline and dosulepin (dothiepin) – are more toxic than others. When antidepressants are equally effective, it is preferable to prescribe those less toxic in overdose. The pattern of self-poisoning with antidepressant drugs is therefore of interest as alterations in prescribing practice could influence the outcome from self-poisoning.

Data from UKPID show that telephone enquiries to the NPIS concerning antidepressants are common, accounting for 9% of enquiries to the service. The demographics of patients who self-poison with antidepressants differ substantially from that seen for the majority of telephone enquiries to the NPIS, with a smaller proportion of enquiries concerning children and the majority being intentional overdoses involving middle-aged adults (Figure 4.8).

TOXBASE accesses concerning antidepressants continue to increase. SSRIs are the commonest antidepressants involved and the trend towards increased hits for SSRIs continues. This reflects the changes in prescribing practice for antidepressants in recent years for the UK. SSRIs are less toxic in overdose than the cyclic antidepressants.

There has been little change in the absolute number of TOXBASE accesses, with around 20,000 accesses occurring each year (Figure 4.9). SSRIs are the antidepressant drugs most commonly involved in telephone enquiries.

Within the TCA group, amitriptyline and dosulepin (dothiepin) are the commonest drugs taken in overdose (Figure 4.10). Unfortunately, they are also amongst the antidepressants that are most toxic.

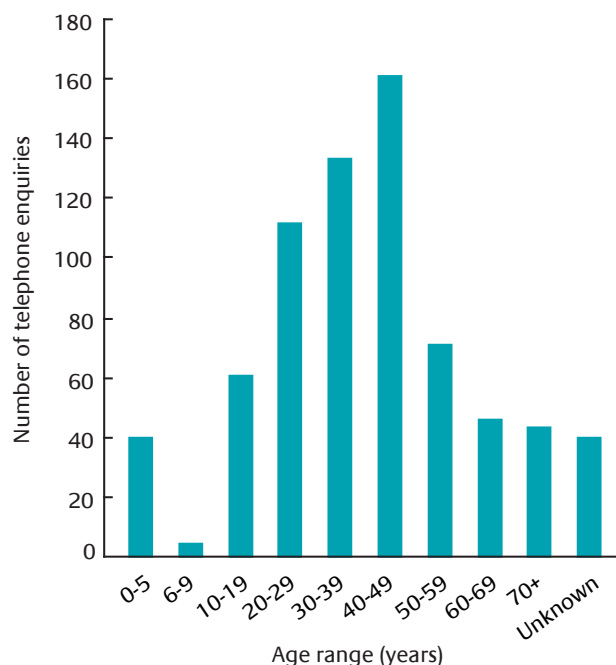


FIGURE 4.8 Age of patients reported in telephone enquiries involving antidepressants in 2009/10

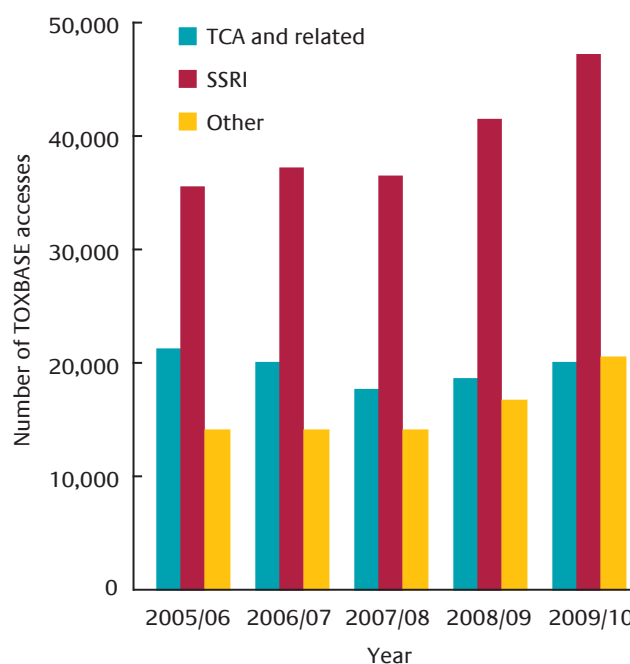


FIGURE 4.9 TOXBASE accesses to different antidepressant types from 2005/06 to 2009/10

Antidepressant poisoning remains a major source of toxicity within the UK. Although the proportion of enquiries related to more toxic drugs is falling, the actual number of enquiries for the more toxic classes of drugs has changed little.

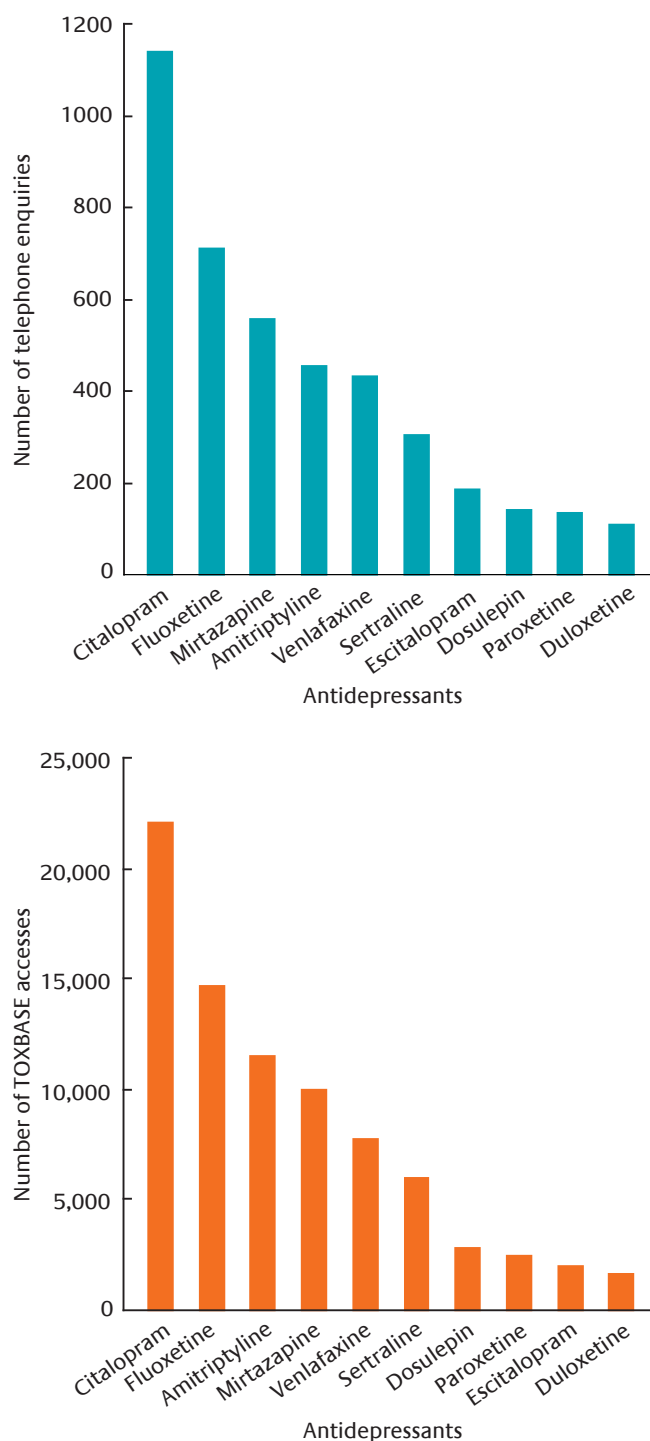


FIGURE 4.10 Antidepressants most commonly involved in telephone enquiries and accessed on TOXBASE in 2009/10

## 4.6 Carbon Monoxide

Despite public awareness campaigns, carbon monoxide poisoning continues to be an important preventable cause of morbidity and mortality in the UK. During 2009/10 there were 386 telephone enquiries to the NPIS regarding confirmed or suspected carbon monoxide exposure; 290 of these related to incidents, while 96 enquiries were for information only. In 39 enquiries multiple individuals were involved, so that the total number of patients was at least 403 (in some cases the number of individuals exposed was not known). The maximum number of individuals exposed in a single incident was 17. This involved residents in rented accommodation in which the carbon monoxide detector gave an audible alarm; subsequent investigation resulted in the central heating boiler being condemned.

The seasonal variation in the numbers of telephone enquiries relating to carbon monoxide poisoning for 2008/09 and 2009/10 is shown in Figure 4.11. This demonstrates the reduced frequency of enquiries in the summer months, presumably due to reduced use of heating appliances. In addition, an increased number of enquiries in the winter months of 2009/10 compared to the previous year has been recorded. This may be related to the particularly harsh winter of 2009/10.

Most enquiries (240 of 290 or 83%) during 2009/10 involved carbon monoxide exposure at home, compared to just 8% occurring in the workplace and 4% reported in a public area. The suspected source of carbon monoxide in the domestic setting is known in 71% of cases; central heating boilers were implicated most often (Figure 4.12).

Of the 290 enquiries, 266 were reported to be accidental, eight were deemed intentional and, in the remaining 16, the intention was uncertain but was probably accidental in ten. Of the 266 accidental exposures, 244 had a poisoning severity score of 0 or 1 (minor toxicity) at the time of the enquiry, nine had features of moderate toxicity (PSS 2), and five were graded PSS 3 indicating features of severe poisoning; a PSS was unavailable in the remaining eight enquiries.

All five severe cases involved patients who had been exposed to carbon monoxide through smoke inhalation during a domestic fire, so factors such as thermal injury may also



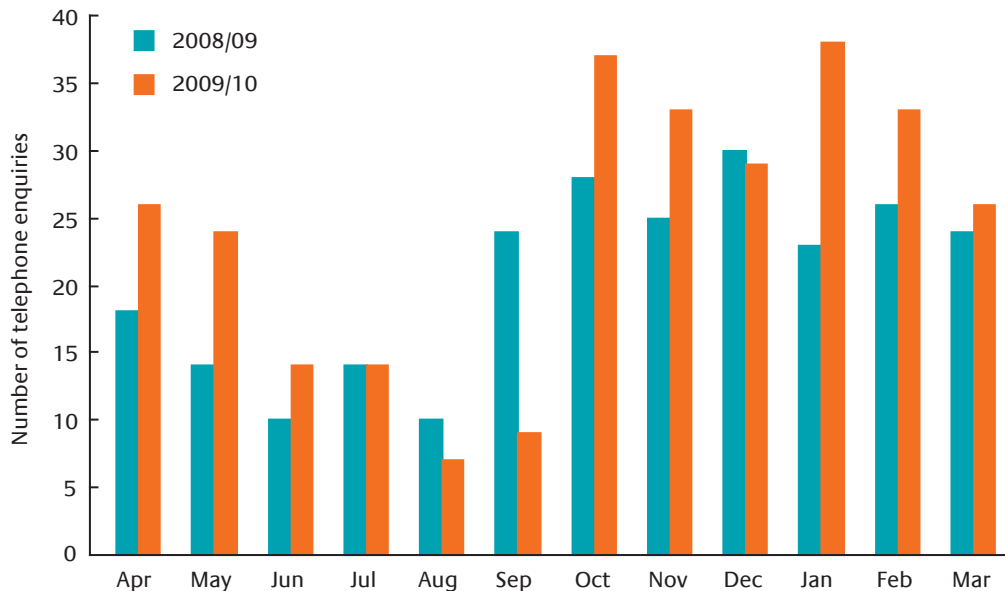


FIGURE 4.11 Telephone enquiries regarding carbon monoxide exposure received each month in 2008/09 and 2009/10

have contributed to their features. Carboxyhaemoglobin concentrations in these patients ranged from 4.9–38%. Follow-up was attempted in all cases: two patients recovered completely, one survived but suffered hypoxic brain injury and in the remaining two cases follow-up information could not be obtained.

Of the eight intentional exposures, six involved attempts at suicide using vehicle exhaust fumes, one was an attempt at suicide which involved the lighting of a barbeque in a confined space, and one involved the inhalation of carbon monoxide from a cylinder. Two of these patients presented with significant poisoning, with carboxyhaemoglobin concentrations of 41.6% and 29.7%; the remaining patients displayed only minor features.

In three further cases involving victims of house fires, the circumstances of exposure were classified as ‘unknown’ but it was considered possible that the fires had been started deliberately. Carboxyhaemoglobin concentrations at presentation were 14.8%, 20% and 60%; the patient with the highest concentration died.

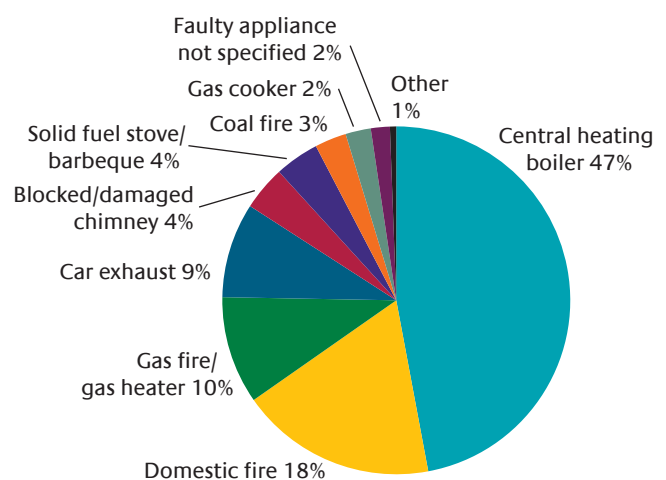


FIGURE 4.12 Suspected source of carbon monoxide exposure in a domestic environment in 2009/10

## 4.7 Alcohol-containing Hand Gels

There has been increasing concern in recent years about the transmission of infections including Methicillin Resistant Staphylococcus Aureus (MRSA), particularly in healthcare establishments. As part of infection control measures, alcohol-containing hand gels have been made more readily available. If ingested these can produce toxic features.

Telephone enquiries about these agents remain uncommon in the UK with only 119 received during the year. However, this represents an increase of 33% from last year. The majority of these calls involved children aged five years or less, with a second peak being seen for adults in their third decade (Figure 4.13).

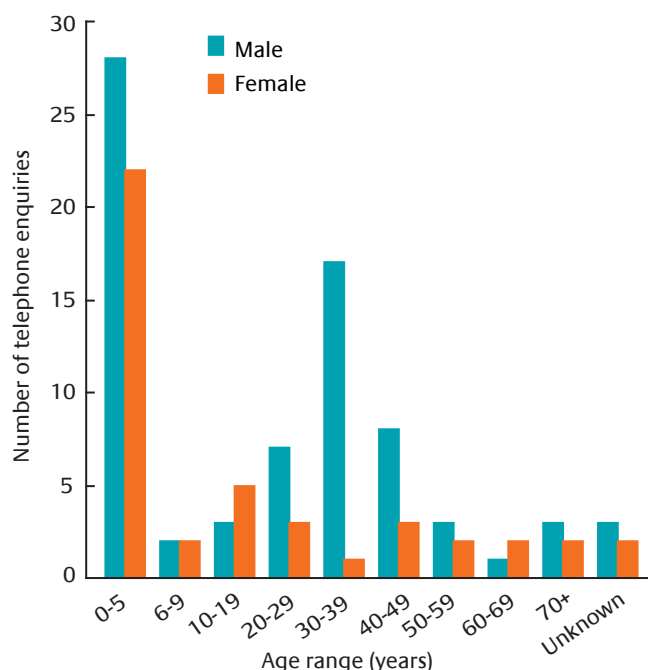


FIGURE 4.13 Telephone enquiries concerning alcohol-containing hand gels by age of patient in 2009/10

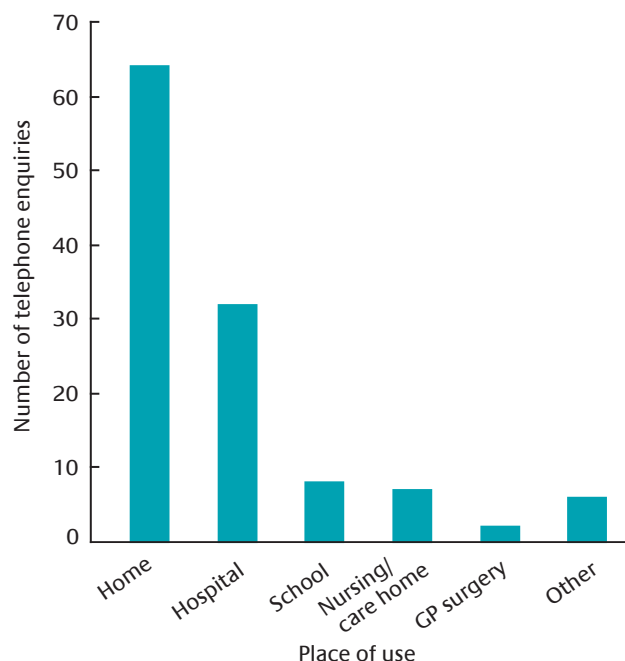


FIGURE 4.14 Telephone enquiries involving alcohol-containing hand gels by place of use in 2009/10

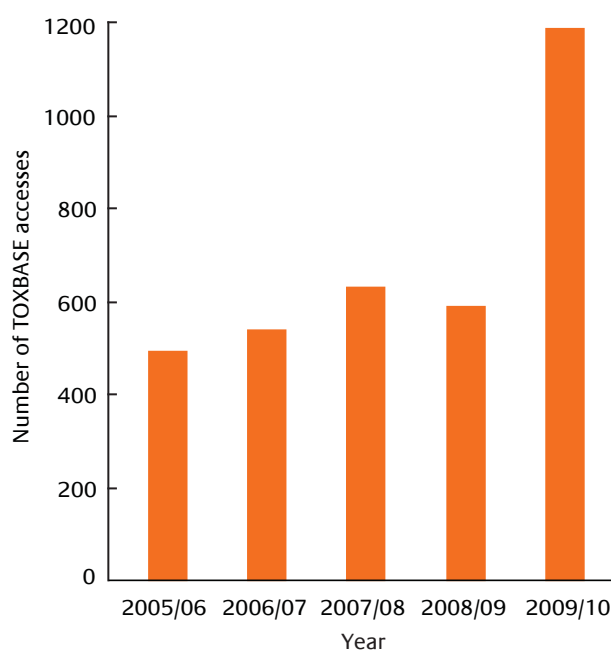


FIGURE 4.15 TOXBASE accesses to alcohol-containing hand gels from 2005/06 to 2009/10

Whilst most exposures (64 cases or 54%) occurred in the home, a substantial number (41 cases) occurred in healthcare facilities (Figure 4.14). Exposures at home were largely accidental and involved children, whilst those in adults more commonly occurred in healthcare facilities including hospitals, GP surgeries and care homes where the availability of the product and an intention to consume it deliberately contribute to the greater number of exposures.

Ingestion was the most commonly reported route of exposure, whilst eye contact was reported in 11 cases.

Whilst TOXBASE does not record the reason a particular information page has been accessed, it does show that the rate of enquiries concerning these gels has been increasing in recent years (Figure 4.15).

In conclusion, alcohol-containing hand gels are a potential source of toxic exposure and care is required in the storage of these products near vulnerable patients.

## 5 Clinical Governance

As a frontline clinical service it is essential that the NPIS has robust clinical governance mechanisms in place to ensure that the information and advice provided are of the highest possible standards and meet the requirements of our users. These mechanisms are defined in detail in a series of operational procedures that are available to all NPIS staff on TOXBASE. They include appropriate induction, initial training and appraisal of staff, national arrangements for continuous professional development, access to high quality information sources, early peer review of enquiry answers, and continuous support from senior staff including 24-hour availability of a consultant clinical toxicologist. Reporting and review of critical incidents, complaints and near misses allows sharing of lessons learned throughout the service. Views of our users are sought by quality assurance exercises encompassing use of TOXBASE, the telephone enquiry services for NPIS and UKTIS, and of enquiries referred to a consultant.

### 5.1 Analysis of Critical Events

All NPIS staff are able to report critical events or near misses and any complaints or observations on the quality of the service are treated under the same system. Critical events are examined by the Director of the originating unit in the first instance and then reviewed at the Clinical Standards Group meeting where recommendations on further actions are made. If urgent changes are required, there are mechanisms available for rapid discussion amongst the NPIS units and implementation of changes nationally.

During 2009/10, nine critical incidents were reported and discussed by the Clinical Standards Group. In none of these was it identified that the NPIS had provided inaccurate or inappropriate advice, but in six cases changes were made to the relevant TOXBASE entry in order to make the advice clearer for healthcare professionals to follow.

In addition, there were several incidents involving technical problems with telephone routing which required discussion with the telecommunications provider for their resolution.

### 5.2 Quality Assurance Exercises

#### TOXBASE

To obtain formal quality assurance on TOXBASE from users an online quality assurance questionnaire was placed on TOXBASE during March 2009.

An automated system was designed to ask a selection of users to complete and submit short quality assurance forms during their online session. Invitations can be set to be generated between every two and fifteen database logins and this number was varied throughout the year until a return rate of, on average, around three to five per day was achieved.

A total of 1191 returns were received between 1 April 2009 and 31 March 2010. The respondents were NHS Direct/NHS 24 staff (333), NHS nurses (289), junior hospital doctors (230), pharmacists (65), hospital consultants (76), ambulance staff/paramedics (55) and general practitioners (44). The remaining 154 indicated another designation – these included middle grade doctors and biomedical scientists.

On type of enquiry, 590 users reported that they primarily used TOXBASE for 'routine enquiries', 182 for 'complex enquiries' and 419 for a 'triage decision'. On frequency of use, 449 reported using TOXBASE daily, 498 weekly and 244 accessed it only occasionally.

Users were asked to grade a series of statements on a scale of 1–6, where 1 was disagree completely and 6 was agree completely. Satisfaction scores were high (Table 5.1).

TABLE 5.1 Summary of user satisfaction scores

Rank	Question	Satisfaction score*
1	I had confidence in the information for my query	92.9
2	Logging on to the database was easy	85.1
3	The information was sufficient for managing this case	83.7

\* Satisfaction score is the proportion of respondents who agree 'completely' or 'a lot'

When asked to indicate their overall satisfaction with TOXBASE on a scale of 1–6, where 1 was poor and 6 was excellent, 1033 (87%) scored either 5 or 6.

Users commented on several issues, including IT problems and difficulties in searching the database. Where users provided contact details responses were made to specific queries and comments; however, most users chose not to provide contact details. Users were also directed to the help section on TOXBASE where a guide to searching is provided, and to the TOXBASE e-learning module, available at [www.toxbase.co.uk](http://www.toxbase.co.uk).

User suggestions are considered and discussed at the TOXBASE Editing Group and NPIS Clinical Standards Group meetings. Issues specific to entries are dealt with as they arise.

In summary, the majority of respondents reported that use of TOXBASE was easy and that it provided the information they required. The questionnaire has improved feedback to the NPIS and the TOXBASE Editing Group and has allowed improvements to be made to the search facility.

Further quality assurance returns on TOXBASE will be used to monitor progress and feedback to the service on these issues and aspects of data content and presentation.

## Telephone information service

Since 2002 the NPIS units have collected information on user satisfaction with the telephone service, to establish if it is meeting the needs of their users and to identify and address problems, both internal (e.g. difficulties accessing the service or inappropriate advice) and external (e.g. inadequate access to TOXBASE or use of referral protocols).

This report provides the results of the stakeholder quality assurance questionnaire exercise for 2009/10, the seventh national exercise to be conducted in accordance with the national contractual arrangements with the HPA.

Questionnaires were sent to a sample of callers, with the sample size intended to be at least 4% of all telephone enquiries in each unit, with the exception of Edinburgh, which

is required to survey a larger proportion in order to obtain an adequate sample size, because it takes fewer telephone enquiries. A common method of random allocation of calls for stakeholder feedback was used.

Data are presented for the period April 2009 to March 2010. Equivalent figures for 2008/09 are provided in parentheses for comparison. During 2009/10, the four NPIS units answered 52,065 enquiries [56,185] that involved a specific patient and sent out 2,273 [2,239] questionnaires, a 4% sample overall. There were 987 [1,016] responses with a response rate of 43% [45%], which is typical for surveys of this type. The numbers of questionnaires sent out and returned remain comparable to previous years.

The designation of respondents reflects the users of the service (45% medical and 55% non-medical staff). During 2009/10 the proportion of callers accessing TOXBASE before ringing the service was similar to that in the previous year.

For those accessing TOXBASE first, the telephone enquiry was most often made because, as in previous years, they considered that there was too little information available on TOXBASE to answer their specific enquiry (60%) [62%] or that there were special circumstances (31%) [25%]. However, during 2009/10, there has been a reduction in the proportion of respondents who considered that the information on TOXBASE was inadequate or that they could not interpret it. In keeping with previous trends, there has been a continued reduction in respondents reporting local protocols requiring them to make a telephone enquiry, or making enquiries because information on TOXBASE appeared to conflict with other information.

In those who did not access TOXBASE first, the proportion who did not know what TOXBASE was increased to 36% [22%]. As previously, most respondents in this group were GPs. Although access to TOXBASE continues to improve, with only 18% [28%] of respondents reporting that they do not have access, a number of users still experience difficulty logging on (11%) [16%]. The numbers of people reporting that they have not been trained has been falling consistently since 2005/06.

To assess the quality of the service as perceived by users, respondents were asked to what degree they agreed or disagreed with a series of statements relating to the particular

enquiry they made to the NPIS. Although questions are framed differently, in the results high scores always indicate a high overall satisfaction rating.

Respondents showed a high degree of satisfaction in the way they answered the various questions posed, especially those relating to the politeness of the staff, the relevance of the reply, confidence in the reply, and the amount of information provided (Table 5.2). Satisfaction scores were lowest with the speed of delivery of information and the time taken to answer the telephone, although satisfaction scores were still more than 85% for both these questions. There was little change in the rank order of satisfaction scores compared to last year.

TABLE 5.2 Summary of satisfaction scores

Rank	Question	Satisfaction score*
1	The person I spoke to was polite and pleasant (agree)	97.6
2	The reply from NPIS was relevant and useful (agree)	95.6
3	I had confidence in the reply I was given (agree)	95.3
4	The information was sufficient for my needs (agree)	94.0
5	Once I got through to the Specialist in Poisons Information the enquiry took too long to be dealt with (disagree)	93.1
6	I was given too much information (disagree)	91.4
7	I had to wait a long time before the phone was answered by a Specialist in Poisons Information (disagree)	89.7
8	The information was given to me too quickly (disagree)	86.9
*Satisfaction score is the proportion of respondents who agree (or disagree) 'completely' or 'a lot'		

Across all items the quality of service has been maintained since 2004/05 (Figure 5.1) and evidence of improvement in perceived quality has been observed for the following:

- 'I had to wait a long time before the phone was answered by a Specialist in Poisons Information' (disagreed: 90% in 2009/10, 85% in 2004/05)
- 'The information was given to me too quickly' (disagreed: 87% in 2009/10, 77% in 2004/05)

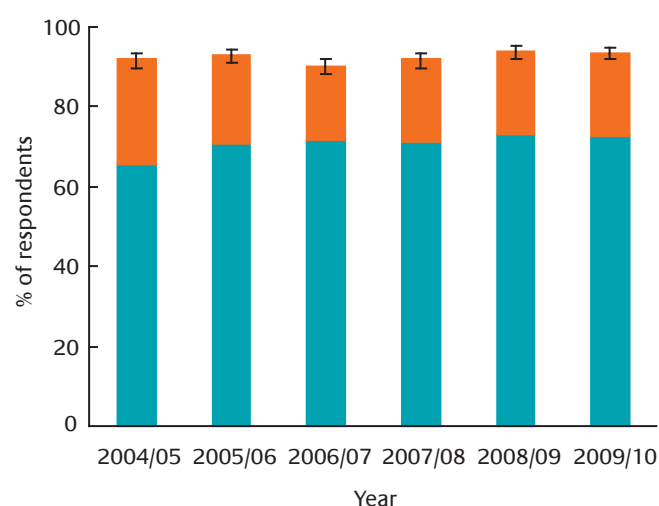


FIGURE 5.1 Overall quality scores (with 95% confidence intervals) for the NPIS units expressed as the percentage of respondents scoring 5 (orange) or 6 (blue) out of a possible 6. Non-respondents are excluded from the denominator

Because of variations in response rate and limited sample size, small differences in results between the units may be difficult to interpret. Formal statistical comparisons have not been performed, although 95% confidence intervals are supplied for the overall quality scores.

The patterns of enquiries by professional grouping are broadly similar between units, although, as in previous years, a higher proportion of respondents to the Edinburgh unit were GPs and a lower proportion were from NHS Direct/NHS 24.

Failure to access TOXBASE before calling the NPIS was more common for callers to Edinburgh than for the other three units, which may reflect the increased numbers of GPs

sampled by the Edinburgh unit. Ignorance of TOXBASE was most common in respondents to Newcastle; this may reflect the high proportion of enquiries from London and the South East where historically less use has been made of TOXBASE. Protocols to ring the NPIS for all cases of poisoning are now infrequently reported but appeared to be more common from respondents to the Birmingham unit.

All units had a satisfaction rating of over 90% for all questions, except that satisfaction about waiting times was less for enquirers to the Newcastle and Birmingham units, the time taken to handle enquiries once answered (Edinburgh), information being provided too quickly (all units), and being given too much information (Edinburgh).

The proportions of respondents indicating high overall satisfaction scores (Figure 5.2) were above 90% for all units, with the rank order being Birmingham (99%), Newcastle (96%), Cardiff (96%) and Edinburgh (94%).

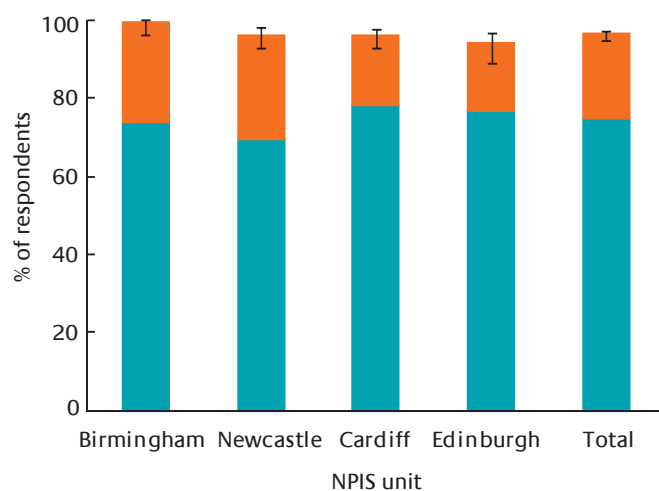


FIGURE 5.2 Overall quality scores (with 95% confidence intervals) for the NPIS units in 2009/10, expressed as the percentage of respondents scoring 5 (orange) or 6 (blue) out of a possible 6

In summary, respondents continue to have a high level of satisfaction with the service, both overall and for each of the specific issues under enquiry. Satisfaction was slightly less relating to information being delivered too quickly and the time taken to answer the telephone, but responses to all of

these have improved since 2002. No specific issues were identified where there has been a reduction in satisfaction over time.

In the light of these results, the NPIS units should continue to raise the profile of TOXBASE, particularly in the primary care setting, and encourage its widespread availability. TOXBASE entries should increasingly highlight the need to discuss more complex cases with NPIS specialists and provide clear guidance on the need for consultation. NPIS staff should take particular care to provide information at an appropriate pace to meet the enquirer's needs.

## Consultant referrals

Last year's annual report included two quality assurance exercises (started in January 2009), one to callers who spoke to a consultant and one to the consultant taking the enquiry, to assess the effectiveness of the system. These exercises continued for part of 2009/10 and returns from this year are reported here with an additional exercise involving specialists in poisons information (SPIs).

### Response from enquirers referred to NPIS consultants

There were 37 replies received during 2009/10 (14 consultants, 14 junior doctors, three GPs, one nurse and five others). Only one respondent did not have a clear recollection of the call. Seven had asked to speak to a consultant, 27 spoke to a consultant because the SPI advised it, two said that there was another (unstated) reason, and one said that they requested it and that the SPI advised it.

Respondents were asked how long it took before they spoke to the consultant. Of the 36 who could remember, 33 replies gave a time of less than one hour, one said less than two hours, one said three hours and the last said 'same day'. No respondent said that any delay affected patient care.

Enquirer satisfaction scores for the service that respondents received from the consultant referrals were high (Table 5.3) and overall on a scale of 1–6, where 1 was very poor and 6 was excellent, respondents scored the service at 5.6.



TABLE 5.3 Summary of enquirer satisfaction scores

Rank	Question	Satisfaction score*
1	The person I spoke to was polite and pleasant (agree)	94.6
1	I had confidence in the advice I was given (agree)	94.6
3	The advice from the NPIS Consultant was relevant and useful (agree)	86.5
3	The information was sufficient for my needs (agree)	86.5
5	The information was given to me too quickly (disagree)	81.1
5	I was given too much information (disagree)	81.1
* Satisfaction score is the proportion of respondents who agree (or disagree) 'completely' or 'a lot'		

### Response from NPIS consultants who have taken clinician referrals

There were 69 replies received between April and July 2009. In 66 cases the consultant had a clear recollection of the call. In 28 cases the caller asked to speak to a consultant, in 19 cases it was the consultant's decision after discussion with the SPI, and in 14 cases the SPI suggested it. In a further three cases the consultant could not remember; in one case the consultant happened to be in the room at the time of the enquiry; in one case there was another reason (unstated); in one case the consultant was unsure if he or the SPI had felt a direct discussion was necessary; and finally in two cases the question was not answered.

Consultants reported that they contacted enquirers rapidly: in 51 cases this was within five minutes, three could not remember the exact timing and the remainder were within 25 minutes. Delays in responding to the caller were due mainly to delays in reaching the doctor at the hospital, or occasionally having to perform further research on unusual substance(s) involved before answering.

Consultants were generally happy with the appropriateness of referral, the way information was presented to them, and the service they had provided (Table 5.4). Consultants were asked to grade the service they provided on a scale of 1–6, where 1 was very poor and 6 was excellent. The average was 5.4, which compares well with the average of 5.6 as assigned by callers for the overall quality of the service.

TABLE 5.4 Summary of NPIS consultant questionnaire scores

Rank	Question	Satisfaction score*
1	The person I spoke to was polite and pleasant (agree)	97.1
2	The referral to an NPIS Consultant was appropriate (agree)	95.7
3	The information I provided appeared to be understood (agree)	94.2
4	The information from the enquirer was well presented by the SPI (agree)	82.6
5	I obtained additional material from the enquirer that they had not initially reported or been asked (agree)	34.7
* Score is the proportion of respondents who agree 'completely' or 'a lot'		

### Response from specialists in poisons information who have referred calls to NPIS consultants

It was agreed by the Commissioner that NPIS specialists in poisons information would also be surveyed on their experience of call referral. There were 114 replies received and in all the SPI had a clear recollection of the call. In 11 cases the enquirer asked to speak to a clinician; in 58 the enquiry met the NPIS criteria for referral to an NPIS consultant; and in two cases both these applied, i.e. the clinician asked for the referral and it met the criteria. In 41 cases there was some other reason (unusual case or specific enquiry which the SPI could not answer, or the clinician had already spoken to an NPIS consultant); and in two cases the question was not answered.

SPIs were reported to contact NPIS consultants rapidly: in 71 cases this was within five minutes, for one case the time could not be remembered, and the remainder were within 35 minutes. Delays to referring the call included having to check multiple calls about the patient and having to use more than one method (e.g. pager and mobile) before reaching the consultant. NPIS consultants carry mobile phones but these are sometimes inaccessible in hospital buildings due to signal screening.

In 39 calls the clinician spoke to the caller directly and in 75 cases the SPI relayed the information. In 89% of enquiries SPIs were satisfied that this was appropriate.

SPIs were generally happy with the handling of the call and on a scale of 1–6, where 1 was very poor and 6 was excellent, scored the service at 5.5.

TABLE 5.5 Summary of NPIS SPI questionnaire scores

Rank	Question	Satisfaction score*
1	It was difficult to contact the clinician (disagree)	95.6
1	The clinician took a long time to answer (disagree)	95.6
3	I had confidence in the advice given to me by the clinician (agree)	95.5
4	The information given to me by the clinician was relevant and concise (agree)	95.4
4	The advice was relevant and concise (agree)	95.4
6	The clinician I spoke to was polite and pleasant (agree)	89.5
7	The clinician requested more information than I had available (disagree)	87.4
* Satisfaction score is the proportion of respondents who agree (or disagree) 'completely' or 'a lot'		

## Summary

In conclusion, callers, consultants and SPIs all rated the service provided highly, and interdisciplinary working was generally of a high standard as judged by these anonymised scoring systems. Most callers thought the advice was relevant, useful and sufficient, and they had confidence in the reply. Some callers thought too much information was given too quickly, but the majority were satisfied.

Consultants generally thought the referrals were appropriate and the information was well presented by the SPIs. They often obtained additional information while speaking to the caller that had not been acquired earlier. They considered that the callers generally understood the information they were given. Callers, consultants and SPIs were all generally considered polite and pleasant. Callers appeared to consider that it took longer for the consultant to contact them, while consultants usually thought they had contacted the caller very quickly, but there were occasional delays in the SPI contacting the NPIS consultant. In some units it is now possible to pass the caller directly to the consultant, while the SPI also stays on the line for recording purposes. This is to be extended to all units. As all responses were anonymised, it is not possible to link enquirer and NPIS consultant responses and assess their correlation.

The small numbers involved means these data should be interpreted with caution. The audit of enquirers being put in contact with NPIS consultants will be repeated later this year.

## UKTIS telephone enquiries

A random sample of 240 (6%) enquiries, 20 per month, made directly to UKTIS was selected for quality assurance monitoring. Questionnaires were sent out to enquirers between one and four weeks after the enquiry. As of May 2010, 98 (41%) forms had been returned. The responders were hospital consultants (12), junior hospital doctors (3), pharmacists (44), GPs (30), nurses (6), specialist registrar (1), Research Fellow in Fetal Medicine (1), and health advisor (NHS Direct) (1). The majority of respondents (39%) had used the service between one and five times previously, with a further 20% being first-time enquirers (Figure 5.3).

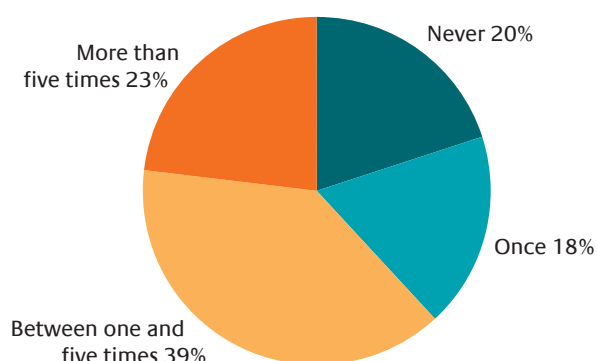


FIGURE 5.3 Number of times telephone enquirers had used UKTIS in the past year

Respondents were asked to rate their overall satisfaction with the service received from UKTIS in answering their enquiry. On a scale of 1–6, where 1 was very poor and 6 was excellent, 90 (92%) scored the service as very good (point 5) or excellent (point 6).

Users were asked to grade a series of statements using the same 1–6 scale. Once again, satisfaction scores were high (Table 5.6).

TABLE 5.6 Summary of UKTIS enquirer satisfaction scores

Rank	Question	Satisfaction score*
1	The person I spoke to was polite and pleasant (agree)	93
2	I had confidence in the reply I was given (agree)	90
3	The information was sufficient for my needs (agree)	82
4	The reply from UKTIS was relevant and useful (agree)	80
5	Once I got through, the enquiry took a long time to be dealt with (disagree)	75.5
5	The information was given to me too quickly (disagree)	75.5
* Satisfaction score is the proportion of respondents who agree (or disagree) ‘completely’ or ‘a lot’		

Ninety-four (96%) respondents reported that they found it easy to contact UKTIS and the majority were happy with the amount of information they received from the service (95%). All the respondents said they would use the service again.

The last section of the questionnaire invited the enquirers to make comments and suggestions on how the service could be improved. This section was completed by 37 (38%) of the respondents. The majority of the comments made reflected satisfaction with the high quality service provided.

# 6 Five Years of UK-wide Development and Joint Working

It is now five years since the National Poisons Information Service adopted a national networked service with a single national telephone number and shared rota arrangements between the four NPIS provider units. In this section we review changes that have taken place during this period.

## 6.1 Telephone Service and Rotas

In July 2005 a networked NPIS telephone service was introduced with a single national number available to all medical professionals in the UK. Prior to this change the NPIS units in Birmingham, Cardiff, Edinburgh and Newcastle offered independent 24-hour services to their local users.

Poisons information is available by telephone from all four units between the hours of 08.00 and 20.00, Monday to Friday, with two units being available in the daytime and evenings during weekends and public holidays and one unit remaining open overnight.

During the daytime each unit handles calls from its designated geographical area, although in the event of all telephone lines being busy, a sophisticated 'hunt and pick' system forwards calls automatically to a unit where a line is available. This automatic routing has resulted in a more effective call-answering system. Outside core hours the Birmingham, Cardiff and Newcastle units participate in a national rota which is supported by a call-switching programme provided by British Telecom.

A business contingency plan has been introduced to ensure the 24-hour-a-day integrity of the service. Should any of the units participating in the out-of-hours rota be unable to accept enquiries by their landlines then calls can be diverted to designated mobile phones using the BT 'Follow Me' service. This ensures service delivery irrespective of the location of specialists in poisons information.

## 6.2 UKPID and Surveillance

Information given during telephone enquiries to the NPIS is recorded on to an electronic database, the United Kingdom Poisons Information Database, UKPID. Historically, each NPIS unit recorded its own data locally. However, data collection was not uniform nationally, with three units using UKPID and the fourth a proprietary local database.

With the development of a more closely networked service, the need for harmonised data collection became more important to support UK resilience and the opportunity for undertaking surveillance at a national level became possible. For more than two years, all NPIS units have been collecting data using UKPID which are encrypted and stored on a secure database. These data are available to the NPIS units in near real time, which facilitates continuity of patient care, should advice by more than one unit be required. Older historical data remain available by interrogating the central server in conjunction with a local server.

The UK is thought to be unique in that it is the only country which records national data from all poisons information centres in real time, rather than a more limited number of core data fields. A UKPID user group, consisting of representatives from every NPIS unit, meets regularly to ensure that the current system works well and to produce advice on future developments.

The data concerning telephone enquiries in this report are generated from UKPID. Where possible, a full set of data is collected during each contact and most data are recorded in a harmonised manner in dedicated specialised fields, although free text fields are also available to record, for example, complicated details of the medical history. Sometimes not all information is available to the NPIS – for example, the age of the patient may not be stated.

Data are collected concerning the reason for the enquiry and include the identity and location of the enquirer. Where possible, the demographic data for the patient are collected and the nature of the putative exposure is recorded. The details for the latter may include the name of the substance or its ingredients, the amount taken, the route by which the exposure occurred, the time of exposure and the location of the exposure. In addition, the clinical condition of the patient is recorded, together with any prior treatment.

A record of the advice given to the caller, either by the specialist in poisons information (SPI) or by the consultant clinical toxicologist, is also recorded. A judgement is made by the SPI concerning the clinical condition of the patient and this is recorded on UKPID as a poisoning severity score. Specific treatments recommended are recorded in a structured format to facilitate data interrogation.

Each UKPID record is 'buddy checked' for completeness, and as a quality assurance measure concerning the advice given.

Some data fields are considered essential – for example, the source of the enquiry – whilst others are desirable. Audits are undertaken to ensure UKPID data collection remains of a high quality and that data collection is performed uniformly within the NPIS.

UKPID data are being used increasingly to contribute towards the evidence base for decisions concerning public health in the UK. For example, anonymised data have been provided to regulatory authorities to facilitate decisions involving the risks and benefits of some medicines currently on the market. UKPID has also provided data concerning the changing pattern of use of drugs of misuse, including cathinones which have been marketed recently as potentially 'legal highs'. In addition to being able to provide data concerning the rapidly increasing frequency of contact with the NPIS concerning

these chemicals, it is also possible to interrogate the database to provide information concerning the clinical effects of the newly seen compounds. Some of these issues are described in further detail elsewhere in this report.

It is hoped that future developments to the database will enable follow-up data to be stored in a structured and harmonised way. This should improve the ability of the NPIS to learn from the outcomes of cases upon which advice has been given and strengthen the service for the future.

## 6.3 TOXBASE

TOXBASE is the first point of contact for most enquirers using the NPIS. The number of accesses to the database has increased steadily since its placement on the internet in 1999, and now, on average, an access is made approximately every minute and a product download made every 30 seconds. Significant work has been done to support this key NPIS resource over the last five years, including the requirement to update regularly the large number of products entered on the database.

The most important development has been the change to a new database platform which facilitates more efficient writing

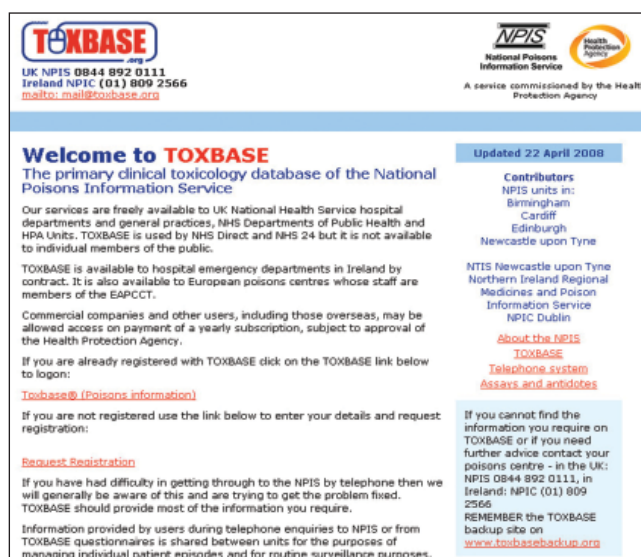
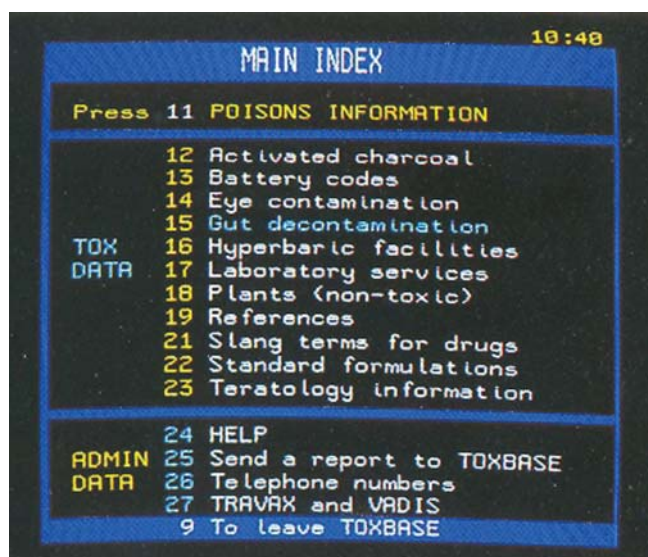


FIGURE 6.1 TOXBASE main index page in the mid-1990s and TOXBASE home page in 2008



and editing of entries. This has allowed the development of a series of 'standard phrases' that guide clinical management of common poisoning scenarios, and common complications of poisoning. NPIS Edinburgh is responsible for the overall control of the database but the work of writing, editing and reviewing database entries is now divided between all four NPIS units.

Draft entries are available on the TOXBASE database for time-limited review by all NPIS consultants and information staff, and in this way a unified position on the management of poisons is obtained. This new way of working has allowed us to increase the numbers of entries reviewed. All commonly used entries are now reviewed annually, and all components of the database every four years.

The new software has enabled improved tracking of edited and changed entries in the database, thus helping to maintain an audit trail. It also allows more flexibility in outputs for users. In this way we now have more active links available and have improved the ability for users to provide information to us and thus the ability to collect data on enquiries about new drugs and compounds of specific interest – for example, pesticides and drugs of misuse.

Since TOXBASE is used by staff with a variety of healthcare backgrounds it is important that entries are clear and easy to understand. To this end, increasing numbers of commonly accessed entries have 'Alert Boxes' prominently displayed which give colour-coded details of the likely toxic risk from a product, together with an indication of the toxic dose. This dose is generally given in milligrams per kilogram body weight, and TOXBASE now includes calculators to assist users in this conversion. Calculators are also now provided to assist in the management of paracetamol poisoning, allowing the determination of appropriate doses of antidote based on the patient's weight.

A new development in 2009 was the introduction of 'Nursing Guides' with suggested care plans for a range of common poisonings. These have been developed by nursing staff who work in the clinical departments associated with the NPIS units. The care plans were downloaded over 7500 times in 2009/10, and their use is increasing. We believe they will improve the care of poisoned patients across the UK.

The screenshot shows the TOXBASE website interface. At the top, there is a banner for 'Health Protection Agency issues advice on health effects of Icelandic volcanic ash plume' with a link for 'More information here'. Below this is a 'Welcome to TOXBASE' section, identifying it as 'The primary clinical toxicology database of the National Poisons Information Service'. A paragraph states that every effort has been made to ensure accuracy and up-to-date information, but providers cannot be held responsible for adverse effects. Another paragraph explains that the database is designed for healthcare professionals and may require expert clinical interpretation. Below this is a 'Newsflashes' section with a blue header. It contains two entries: one dated 'Updated 16 April 2010' about Icelandic volcanic ash and sulphur dioxide, and another dated '1/4/2010' about the MHRA warning on traditional Chinese medicine. To the right of the newsflashes is a sidebar with a blue header 'Updated 23 April 2010'. It lists 'Contributors' (NPIS units in Birmingham, Cardiff, Edinburgh, Newcastle upon Tyne, UKTIS Newcastle upon Tyne, Northern Ireland Regional Medicines and Poison Information Service, NPIC Dublin) and provides a link to the NPIS website. It also includes links for 'About the NPIS', 'TOXBASE', 'Telephone enquiries to the NPIS', and 'About the NPIS - laboratory tests and antidotes'. At the bottom of the sidebar, it says 'If you cannot find the information you require on TOXBASE or if you need further advice contact your poisons service - in the UK: NPIS 0844 892 0111, in Ireland: NPIC (01) 809 2566' and 'REMEMBER the TOXBASE backup site on www.toxbasebackup.org'.

FIGURE 6.2 Newsflashes appearing on TOXBASE (accessed 23 April 2010)

The home page of TOXBASE now includes alerts and newsflashes (Figure 6.2) which are derived from a range of sources, including contacts in poison centres internationally and UK authorities such as the Department of Health and the MHRA. Users can register their contact details so that improved follow-up of poisonings involving new or unusual drugs can be obtained. All entries also have relevant reference lists and direct links to PubMed abstracts of recent papers.

A regular newsletter (Figure 6.3) is published electronically and provided to registered users of the database every two months. This highlights new developments and changes to the database.

TOXBASE is made available under contract to users in the Republic of Ireland as part of the HPA agreement with the Irish government. Under this agreement, specific entries on TOXBASE relating to Irish products are included and reviewed by colleagues in the Irish Poisons Information Centre in Dublin. Under a special agreement with European poison centres that are members of the European Association of Poison Centres and Clinical Toxicologists, TOXBASE is provided under licensed contract to a small number of pharmaceutical companies and overseas health providers. This provides a modest source of income for the NPIS.

The success of TOXBASE has been a remarkable achievement for the NPIS and it is now a fundamental component of the poisons information service in the UK. None of this would have been possible without the support of both colleagues in the service and clinicians working in the NHS who have helped to refine the content of the database by providing feedback. The most recent development in this line has been the online quality assurance tool which is another feature of the new database structure. The user response has been enormously positive; full details are provided elsewhere in this report. Maintaining this standard will be a challenge for the future but we are optimistic that this can be achieved.

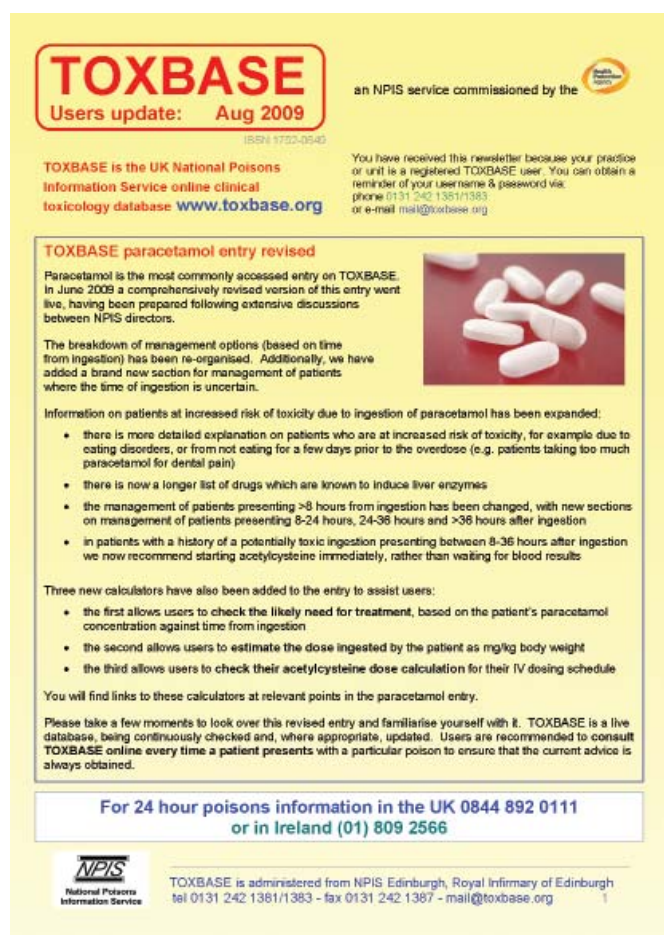
## 6.4 UKTIS

The past five years has been a period of significant growth and development of the UK Teratology Information Service (UKTIS). Originally staffed by a head of teratology, one scientific information scientist and a personal assistant, additional HPA investment has enabled the appointment of new permanent staff to reflect the substantial workload involved in provision of the service.

A major focus over this period has been the upgrading of the UKTIS enquiry and follow-up database to a new 'state-of-the-art' web-based system that will facilitate improved logging of enquiries, follow-up of pregnancy outcomes, and analysis of data for surveillance. All legacy data, including older data previously held as paper records, have successfully been migrated to the new database which went live in the latter half of 2010.

These developments culminated in the relaunch of the service in 2009 as the UK Teratology Information Service (UKTIS), previously the National Teratology Information Service (NTIS), with a new logo, national telephone number and dedicated website ([www.uktis.org](http://www.uktis.org)). The involvement of UKTIS in the HPA emergency response to the 2009 A/H1N1v influenza pandemic has proved instrumental in raising the profile of the service and establishing its new identity.

UKTIS has also focused on increasing its research portfolio, at both national and international level, during this period. External funding for three research projects supporting five further fixed-term positions, including data administrators and senior medical information scientists, has been secured during 2009/10.



**TOXBASE**  
Users update: Aug 2009  
an NPIS service commissioned by the

TOXBASE is the UK National Poisons Information Service online clinical toxicology database [www.toxbase.org](http://www.toxbase.org)

You have received this newsletter because your practice or unit is a registered TOXBASE user. You can obtain a reminder of your username & password via: phone 0131 242 1381/1383 or e-mail [mail@toxbase.org](mailto:mail@toxbase.org)

**TOXBASE paracetamol entry revised**

Paracetamol is the most commonly accessed entry on TOXBASE. In June 2009 a comprehensively revised version of this entry went live, having been prepared following extensive discussions between NPIS directors.

The breakdown of management options (based on time from ingestion) has been re-organised. Additionally, we have added a brand new section for management of patients where the time of ingestion is uncertain.

Information on patients at increased risk of toxicity due to ingestion of paracetamol has been expanded:

- there is more detailed explanation on patients who are at increased risk of toxicity, for example due to eating disorders, or from not eating for a few days prior to the overdose (e.g. patients taking too much paracetamol for dental pain)
- there is now a longer list of drugs which are known to induce liver enzymes
- the management of patients presenting >8 hours from ingestion has been changed, with new sections on management of patients presenting 8-24 hours, 24-36 hours and >36 hours after ingestion
- in patients with a history of a potentially toxic ingestion presenting between 8-36 hours after ingestion we now recommend starting acetylcysteine immediately, rather than waiting for blood results

Three new calculators have also been added to the entry to assist users:

- the first allows users to check the likely need for treatment, based on the patient's paracetamol concentration against time from ingestion
- the second allows users to estimate the dose ingested by the patient as mg/kg body weight
- the third allows users to check their acetylcysteine dose calculation for their IV dosing schedule

You will find links to these calculators at relevant points in the paracetamol entry.

Please take a few moments to look over this revised entry and familiarise yourself with it. TOXBASE is a live database, being continuously checked and, where appropriate, updated. Users are recommended to consult TOXBASE online every time a patient presents with a particular poison to ensure that the current advice is always obtained.

**For 24 hour poisons information in the UK 0844 892 0111  
or in Ireland (01) 809 2566**

**NPIS**  
National Poisons Information Service

TOXBASE is administered from NPIS Edinburgh, Royal Infirmary of Edinburgh  
tel 0131 242 1381/1383 - fax 0131 242 1387 - [mail@toxbase.org](mailto:mail@toxbase.org)

FIGURE 6.3 Example of TOXBASE users newsletter



## 6.5 Clinical Governance and Audit

The NPIS seeks to provide evidence-based clinical advice that is of the highest possible quality and is consistent, irrespective of the unit that has issued the advice. It is our intention that information should be provided as rapidly as possible and should meet the needs of the healthcare professional seeking our support.

In order to achieve these aims, the NPIS has developed operational procedures which are consistent across all units and available at all times to all NPIS staff on TOXBASE. These cover all the issues that are important in providing a high quality service, including appropriate induction and training of staff, referral criteria for consultants, critical incident and near-

miss reporting, and library and other resources for the NPIS units. These operational procedures are reviewed regularly and updated as required and there is the opportunity for all NPIS staff to contribute to that process.

### NPIS clinical governance review

In 2007 NPIS underwent an external clinical governance review (the Evans Review). That review found that at that time the clinical governance arrangements of the service were 'perfectly acceptable and in many respects a better level than that seen in many NHS units', although the potential for further improvement was acknowledged. Current progress in implementing the recommendations of the review team is shown in Table 6.1.

TABLE 6.1 Current progress in implementing the recommendations of the review team

Recommendation	Summary of progress
1 Maintain a telephone contingency to the BT service	'Follow-on' facility to reserve mobile phones instituted in NPIS units in 2007
2 Seek, obtain and provide facilities to record, if possible electronically, telephone advice to and from NPIS units by consultants when on-call	Call recording introduced in all NPIS units in 2008
3 Consider enrolling into the National Call Centre Agency (CCA) to provide high quality review of the contact call system	This approach explored but found to be unsuitable
4 Continue to develop the curriculum of competencies for specialists in poisons information	Competencies for SPIs developed and published
5 Explore and attempt to register such competencies with a national body, such as UKCHIP or HPC	This approach explored but found not to be appropriate
6 Continue to lobby the Royal College of Physicians and JRCPTB with a view to preparing a syllabus and curriculum for clinical toxicology for trainees as an aid to recruitment	Curriculum in clinical toxicology submitted to the RCP and JRCPTB in 2009. Not currently approved (lack of funding)
7 Continue to provide opportunities and funds for physicians and specialists in poisons information to attend joint meetings suitable for CPD	Regular national NPIS CPD meetings instituted with resource for attendance of SPIs and consultants
8 Encourage further discussion with GSTFT and to afford a spirit of rapprochement, but not at the expense of the existing service	Contract negotiated with GSTFT for consultant support for NPIS, starting 2009

## 6.6 Education and Continuing Professional Development (CPD)

Developing the skills and professional expertise of the NPIS workforce is an important challenge. To address this issue the NPIS now organises a regular series of continuing professional development (CPD) programme meetings. These are hosted by each NPIS unit in turn and by the NPIC in Dublin, taking place three or four times a year. An NPIS consultant leads on the development of the programme and all presentations are available to NPIS staff on the TOXBASE website. Meetings are themed around specific topics, and presentations are given by internal and external speakers; Figure 6.4 shows an example of a CPD programme.

There is increasing demand to attend these meetings from those not immediately associated with the NPIS. In response to this, a series of educational events is being organised with the College of Emergency Medicine on poisons-related topics. The first of these will be held in 2010.

All NPIS staff undergo regular appraisal and career development planning. Staff have opportunities to attend and are encouraged to present at national and international academic meetings of relevance to their roles. NPIS staff are regularly invited to speak at educational events nationally and internationally.

Development of the NPIS into a single, unified service under the umbrella of the HPA has allowed further work on educational initiatives. The first was the development of online educational material, initially supported by NHS Education Scotland, that was designed to provide users with an educational introduction into the structure and function of TOXBASE. Subsequently the HPA has funded work to provide educational modules on common poisoning scenarios. In 2010/11 a new module on common chemical poisonings will be launched. These are all available on the NPIS educational website, [www.TOXBASE.co.uk](http://www.TOXBASE.co.uk).

### NPIS CPD Meeting: Antidotes

#### EDINBURGH TUESDAY 21 JULY 2009

Seminar Room 7

Chancellor's Building, Royal Infirmary of Edinburgh

##### SESSION 1

**Chair: Stephen Waring**

- |             |   |
|-------------|---|
| 10.25–10.30 | Introduction and Welcome  |
| 10.30–11.00 | Update on the Role of Flumazenil<br><i>Arvind Veirajah</i>        |
| 11.00–11.30 | DMSA Treatment in Lead Toxicity<br><i>Sally Bradberry</i>         |
| 11.30–12.00 | DMPS Treatment in Mercury Toxicity<br><i>Allister Vale</i>        |
| 12.00–12.30 | Desferrioxamine Treatment in Iron Overdose<br><i>Nick Bateman</i> |
| 12.30–13.30 | Lunch   |

##### SESSION 2

**Chair: Nick Bateman**

- |             |  |
|-------------|--|
| 13.30–14.00 | Special Lecture<br>'Henry Matthew and Clinical Toxicology'<br><i>Alex Proudfoot</i>                |
| 14.00–14.30 | Methythionium Chloride vs Tolonium Chloride<br>for Methaemoglobinaemia<br><i>Michael Eddleston</i> |
| 14.30–14.40 | Coffee   |
| 14.40–14.55 | Update on 'SNAP' Study<br><i>Ruben Thanacoody</i>  |
| 14.55–15.10 | Adverse Consequences of Continuous NAC<br>Infusion<br><i>Euan Sandilands</i>                       |
| 15.10–15.25 | Histamine Effects of NAC <i>In Vitro</i><br><i>James Coulson</i>                                   |

##### SPI MEETING (Seminar Room 5)

**Chair: Alison Good**

- |             |   |
|-------------|---|
| 14.40–14.55 | Flumazaniil – A Further Discussion<br><i>Jeff Dyas</i>          |
| 14.55–15.10 | Cyanide Antidotes for Smoke Inhalation<br><i>Ian Weatherall</i> |
| 15.10–15.25 | Pesticide Project Update<br><i>Richard Adams</i>                |
| 15.25–15.40 | CPD Update<br><i>Stephen Waring</i>                             |
| 15.40       | Close   |

FIGURE 6.4 Example of an NPIS CPD programme

## e-learning

NPIS Edinburgh first developed an e-learning resource in 2005 – [www.toxbase.co.uk](http://www.toxbase.co.uk) – which went live in September of that year. Over 2000 individuals have registered on the site between its launch and 31 March 2010.



As mentioned above, the resource was initially designed to be used for training new staff at NHS 24 centres on the use of TOXBASE, but is also available to NHS Direct staff in England and to other interested NHS users. Registration and access are free to NHS users, who can work through the site at their own pace, save their work, obtain their scores and print a certificate of completion for their continuing professional development file.

Depending upon user type, two levels of the TOXBASE unit are available, Level 1 for NHS 24/NHS Direct users and Level 2 for emergency department nurses/junior doctors. As of 31 March 2010, a total of 1962 users had completed the TOXBASE unit. Completion of the Level 2 TOXBASE unit represents 1.75 hours of study.

A second 'Clinical Toxicology' unit was added to the e-learning site in July 2008. This unit contains modules designed to help junior doctors and triage nurses improve their knowledge on the clinical management of the poisoned patient. Units are available on:

- a** General Aspects (initial intervention, antidotes, clinical syndromes, common dilemmas)
- b** Common Poisons (paracetamol, NSAIDs, benzodiazepines)
- c** Problematic Poisons (tricyclics, SSRIs, calcium channel blockers)
- d** Drugs of Misuse ('the agitated patient', 'an unconscious patient', 'a drowsy patient', 'an unknown substance').

Since this unit's launch 336 users have completed modules. Completion of the whole unit represents 3 hours of study and again a printable certificate is available.

## 6.7 The Next Five Years

The NPIS units now have firmly embedded UK-wide networking arrangements for handling telephone enquiries from healthcare professionals and for providing consistent, up-to-date poisons information online on TOXBASE. The current national structure offers opportunities for the NPIS to develop further in several areas, as funding allows.

### 1 Service organisation

A natural reduction in telephone enquiry workload has taken place over the last decade as a result of increased and improved online access to the information on TOXBASE. This has changed the pattern of staff working, allowing the specialists in poisons information (SPIs) to increase tasks associated with TOXBASE updating when not busy answering NPIS telephone queries including:

- a** Ensuring that the 14,000 monographs on TOXBASE are consistent with current clinical research continues to be the major workload for the service
- b** Developing the use of aggregated data to optimise the NPIS contribution to scientific and clinical debate
- c** Providing timely appropriate NPIS data to government and its agencies
- d** Increasing contributions to appropriate clinical research.

There is the need to ensure that the NPIS units maintain the telephone service to the current high standards but at the same time maximise the productivity of SPIs for other work. It is also important that users of TOXBASE are not over-reliant on online access and that the NPIS continues to ensure appropriate use of individualised telephone advice for complex poisoning enquiries. Maintaining the correct balance between online and telephone advice will continue to be a challenge to support and achieve.

Complex telephone routing arrangements allow calls to be delivered to an appropriate unit but also allow the rare risk of routing errors which can be catastrophic if they occur. Ways to simplify the telephone routing arrangements to reduce the risk of such errors need to be kept constantly under review.

## 2 Consultant support

Considerable resource has been invested in consultant support for the NPIS and a single national on-call consultant rota has been functioning effectively for several years.

However, the following issues still need to be kept under consideration and taken forward in the next five years:

- a** Senior staff retirements are expected in the next three years. Replacements with appropriately trained and experienced staff will be difficult as the potential pool is small. Lack of recognised systematic training programmes for clinical toxicology and information scientists has hampered the formal development of the sub-speciality over recent decades
- b** Skill mix – until recently NPIS consultants have been all adult physicians, usually with accreditation in medicine and clinical pharmacology. However, many other specialities are relevant to the delivery of the aims of the NPIS service. A large proportion of NPIS contacts concern children and many poisoned patients are managed in hospital emergency departments. The NPIS has achieved some limited support with paediatric input to the service from consultants based in the accident and emergency departments in Edinburgh and Newcastle. This small start should help to improve NPIS paediatric advice and also increase the visibility and credibility of the service to those working in accident and emergency and paediatric settings
- c** Enhanced training of NPIS staff in environmental toxicology, and management of poisoning involving radiation, are areas that need addressing to support and enhance joint working with specialists in environmental chemical and radiation hazards and emergency response to environmental disasters.

## 3 UKPID

It is a priority for the service to develop and fund the next version of the poisons database UKPID, following the current review of the system. Key modifications needed to improve the capability of UKPID to support surveillance of poisoning include:

- a** Development of embedded signal-detection methodologies for syndromic surveillance

- b** Introduction of the ability for data to be extracted by all units to the same level of complexity, to allow better sharing of the information analysis workload between units
- c** Development of a database suitable for anonymised data linkage with other relevant data sources such as hospital episode statistics, NHS prescribing data and ONS statistical data
- d** Harmonisation of core datasets with poisons centres across the European Union using fully searchable multilingual dictionary terms.

## 4 TOXBASE

TOXBASE is already established as one of the premier clinical decision support tools used in the NHS, with more than a million product accesses annually. Feedback from users confirm that it is most valued by staff in accident and emergency departments for patient management.

Enhancements that need consideration include developing:

- a** The ability to more closely monitor activity on the database automatically and generate alerts for changes in patterns of enquiries, particularly for rarer poisons
- b** Systems that allow more complete collection of information about a larger proportion of toxins of special clinical interest, their effects and patient outcomes from TOXBASE users
- c** Better search facilities for identifying toxins associated with particular patterns of clinical presentation
- d** Facilities for users to upload their own details, e.g. availability of local laboratory assays and antidotes.

## 5 UKTIS

Enhancements to UKTIS over the past five years have included staff and software developments to improve the logging of enquiries and support better follow-up data. Over the next five years these are expected to deliver better quality data that will improve pregnancy outcome information for healthcare professionals which will be made available on TOXBASE and through peer-reviewed research outputs.

Further developments that need to be considered include:

- a** Develop the UKTIS website to allow healthcare professionals to access reporting forms, monograph summaries and information about ongoing research projects directly
- b** Develop online facilities for pregnant women to provide details of exposures and pregnancy outcome directly
- c** More extensive follow-up of pregnancy outcomes following drug or chemical exposure as facilitated by the new UKTIS database
- d** Undertake regional pilots to explore the feasibility of more effective methods of data collection
- e** Reduce loss to follow-up of women by increasing use of national patient tracing systems
- f** Enhance the visibility of UKTIS amongst key user groups such as midwives, obstetricians and paediatricians
- g** Strengthen links with regulatory bodies and professional organisations including international organisations such as the European Network of Teratology Information Services, the Organisation of Teratology Information Specialists in North America and Motherisk in Canada
- h** Consider developing a business case to establish a public information source of advice on drugs and other exposures in pregnancy.

## 6 NPIS information provision

Enhancements to UKPID, TOXBASE and the UKTIS database allow the NPIS to provide important timely information to public health external agencies. The NPIS also supplies information to national organisations such as the MHRA and ACMD.

There is a need to:

- a** Share this workload between units, which requires upgrades to software already identified
- b** Develop and implement a consistent policy for information provision including ensuring recovery of costs as appropriate
- c** Develop a business case to improved expertise in epidemiology within the service to optimise appropriate data usage, by the appointment of a scientist with expertise in statistics, epidemiology and public health.

## 7 Clinical governance and audit

The NPIS already has high standards of clinical governance involving audit and quality assurance exercises for all the types of activity it performs, from immediate checking of information provided to detailed stakeholder QA exercises. Within the last five years the clinical governance arrangements of the service have been endorsed by an independent review. Continuous improvement in the systems that ensure the quality, safety, review and update of NPIS clinical governance standards are an ongoing requirement.

New developments that should be considered include:

- a** Enhanced audit of the recordings of individual telephone enquiries
- b** Enhanced peer review of advice provided by NPIS consultants.

## 8 Education and CPD

It is essential to the quality of the service that NPIS staff are properly trained for their roles and that there are opportunities for them to improve their knowledge and skills in this specialist field. Great progress has been made over the last five years in increasing the availability of educational opportunities for staff by instituting regular national meetings and by funding attendance of appropriate staff at international events when these offer important educational opportunities that are not available in the UK.

The NPIS has also provided education on the management of poisoning to healthcare professionals outside the service and it would be useful to enhance this activity over the next five years, with the aims of improving the general care of poisoned patients, increasing familiarity with management of chemical releases (including deliberate release), improving knowledge and use of NPIS services, etc. Educational programmes carried out in conjunction with the College of Emergency Medicine are an effective way of reaching one key user group.

Increased access to educational sessions can also be achieved by use of new web-based technology. This would allow staff both within and outside the service to access material at a place and time convenient to them.

## 9 Research

The evidence base for treatment of poisoned patients is relatively small due to the difficulties in conducting research in this patient group. The NPIS units are now well placed to obtain external research funding to conduct clinical trials and other clinical research in this most vulnerable patient group in the UK to optimise treatment and reduce adverse reactions in acutely poisoned patients. Successful conduct of such clinical trials could pave the way to larger multi-centre, international clinical trials to provide the evidence base for the treatment of infrequent poisonings.

Other areas of research include discovery of novel biomarkers of both acute and chronic toxicity and the health effect of new drugs and chemicals in overdose.

## 10 Publicly available information and access

With increasing access to the internet, the general public is faced with a large amount of conflicting information about drugs and poisons from a variety of sources. Consumer pressure to have access to timely and authoritative advice on aspects of the toxicity of consumer products and drugs is likely to increase. As is already the case in many other European countries, there is a case for providing direct access to NPIS information to the general public in the UK. Such information could be provided online through a tailor-made public advice website (e.g. npis.org). Any such public facing advice would need to be consistent with TOXBASE advice.

Such reliable advice would support:

- a** Improved consumer access to reliable information about toxicity and specialist advice when required and improved satisfaction with the service
- b** Optimal use of the emergency services
- c** Reduced referral rates to hospital as shown by the low rates of referral resulting from telephone enquiries to the NPIS
- d** Provision of a platform for poison prevention activities and strategies
- e** Improved data collection on aspects of poisoning especially those episodes not resulting in contact with healthcare professionals, enhancing the surveillance role of the NPIS to underpin appropriate prevention strategy development.

## 11 Preparation for the London 2012 Olympic Games

An NPIS priority for the next two years is to ensure appropriate preparation for the 2012 Olympic Games. The NPIS plans to ensure an enhanced 'business as usual' status for the period surrounding the Olympics. The comprehensive NPIS 24-hour telephone and internet-delivered information service is already provided to registered UK healthcare professionals. The service would offer timely advice on the diagnosis, treatment and care of patients poisoned as a result of a deliberate release or environmental disaster that could be associated with the Olympics, whether such events takes place in London or elsewhere in the country.

In preparation for the 2012 Olympic Games it is proposed, as far as available resources allow, that the NPIS will:

- a** Provide additional staffing over the period around the Olympics to support enhanced resilience
- b** Develop appropriate mechanisms to allow temporary registered access to TOXBASE for appropriate Olympics associated healthcare providers
- c** Develop improved monitoring of unusual enquiry patterns on the NPIS databases UKPID and TOXBASE, to act as sentinels for mass or unusual chemical exposures
- d** Update the clinical advice held on TOXBASE relating to the effects of known chemicals and products considered likely to be potential threats, including their effects on pregnant women and children
- e** Survey NHS laboratories and provide up-to-date advice and information on the local availability and use of relevant laboratory assays
- f** Conduct a survey of NHS trusts to update NPIS information on local NHS hospital holdings of relevant antidotes. This should ensure up-to-date advice and information at the time of the Olympics on the local availability of such antidotes
- g** Consider adding specific data and functionality to TOXBASE to address the potential needs of the Olympics with respect to clinical toxidromes and complex searching.



## 7 Research

Staff of the NPIS are active in research relating to clinical toxicology and poisoning, as evidenced by the numbers of articles published in the medical literature listed in our annual reports (see Appendix B). This research is not a core function of the NPIS units but is important for increasing the evidence base for NPIS advice on poisons management. It is often performed during academic sessions held with universities and funded by external grants. Some examples of research performed over the last five years involving NPIS staff are provided below.

### 7.1 Paracetamol

Paracetamol is the most common medicine taken in overdose in the UK and the most common source of enquiries to the NPIS.

In 1998 the UK health departments limited the availability of paracetamol by over-the-counter sale. Understanding the impact of these changes is important in planning future interventions aimed at reducing the risk of drugs available by this route. The NPIS unit in Edinburgh, working in collaboration with the Information and Statistics Division of the Scottish Health Department, has shown that the overall impact in Scotland was not what had been expected when the legislation was introduced. While there was an initial reduction both in hospital presentations and in deaths, after two years hospital admissions and mortality returned to the levels seen prior to legislation, and subsequently rose above them<sup>1</sup>.

In order to understand this change in more detail specific studies were carried out linking population deprivation and outcomes. This showed that the major impact of paracetamol-induced morbidity and mortality was in deprived populations, principally in the cities, and that these populations had not benefited from the change in legislation<sup>2</sup>.

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1 Bateman DN, Gorman DR, Bain M, Inglis JHC, House FR, Murphy D. Legislation restricting paracetamol sales and patterns of self-harm and death from paracetamol-containing preparations in Scotland. *Br J Clin Pharmacol* 2006; 62: 573–81.

2 Gorman DR, Bain M, Inglis JHC, Murphy D, Bateman DN. How has legislation restricting paracetamol pack size affected patterns of deprivation related inequalities in self-harm in Scotland? *Public Health* 2007; 121: 45–50.

This work has important international implications since paracetamol poisoning is the major cause of drug-related morbidity and mortality worldwide. It suggests that a simple approach of limiting availability by restricting supply at the point of sale may not be fully effective. One of the difficulties with the UK change is that it was not legally enforced and that many of the changes were in fact discretionary. It is also clear that patients can travel from one commercial outlet to another and collect large numbers of tablets with impunity.

Treatment of paracetamol poisoning involves using an intravenous antidote, acetylcysteine. This antidote is commonly associated with adverse effects such as vomiting, rash, wheeze, chest pain, and falls in blood pressure. These features suggest allergy but our work has shown that, although they are due to release of histamine in susceptible patients, this is not an allergic response<sup>3</sup>.

This research has confirmed that patients who have previously had such adverse reactions can be treated without increased risk. In addition, understanding more of the adverse events allows a more targeted treatment to be administered to those patients who suffer adverse effects.

It has been noted that patients who have lower blood concentrations of paracetamol are more likely to develop adverse effects to the antidote. These adverse effects mimic acute allergic reactions and are thought to involve histamine but are not thought to be due to an immunologically mediated mechanism.

Work in Cardiff used a human mast cell culture to examine the effects of paracetamol and N-acetylcysteine, the antidote to paracetamol poisoning, on release of histamine from mast cells. This demonstrated that N-acetylcysteine causes an increased release of histamine from mast cells, but that paracetamol does not. Importantly, the addition of paracetamol and N-acetylcysteine to the cell culture resulted in a smaller release of histamine, mimicking the situation seen clinically. The human cells used do not express IgE receptors on their surface. As these receptors are necessary to produce classical anaphylactic reactions, this provides further evidence that these adverse effects are related to the

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3 Pakravan N, Waring WS, Sharma S, Ludlam C, Megson I, Bateman DN. Risk factors and mechanisms of anaphylactoid reactions to acetylcysteine in acetaminophen overdose. *Clin Toxicol* 2008; 46: 697–702.



concentration of the antidote and not an aberrant immune response. The same effect was also observed in peripheral blood mononuclear cells taken from volunteers, suggesting that cells other than mast cells may be involved in these adverse reactions<sup>1</sup>.

Because of the risk of these adverse effects, it is not considered appropriate to give acetylcysteine to all patients with paracetamol overdose. Appropriate patients for treatment are identified by measuring plasma paracetamol concentration and relating this to the time since overdose using a nomogram. While this approach is almost invariably effective, there are occasional reports of patients who develop toxicity at unexpectedly low plasma paracetamol concentrations. To investigate this further, research involving the NPIS units in Newcastle and Edinburgh was performed to quantify the numbers of paracetamol overdose patients with severe liver failure who had paracetamol concentrations below current thresholds. While some patients were identified in liver units, these were very uncommon. As a result, change to national treatment advice has not been recommended<sup>2</sup>.

The adverse effects of acetylcysteine occur early during therapy when infusion rates and plasma concentrations are at their highest. The possibility that alteration to the infusion schedule, as well as the prophylactic use of antiemetics, might reduce the frequency of adverse effects will be investigated in a randomised clinical trial taking place in Edinburgh and Newcastle. This study, one of the first studies in the UK in patients with acute drug overdose, has now received funding and ethical approval and will start recruiting patients in 2010.

Further research in Edinburgh has focused on the identification of new markers and drug targets that will improve the care of poisoned patients. The protein cyclophilin A has been identified as a new mediator of organ injury in paracetamol poisoning and biomarker validation studies are now being performed in clinical samples. Research has also discovered in human urine and cerebrospinal fluid a population of fat

droplets (exosomes) that contain a range of proteins that change with organ damage. These exosomes represent a novel reservoir for further biomarker discovery<sup>3</sup>.

## 7.2 Co-proxamol

While studying the effects of the licence change on paracetamol poisoning it became clear that in Scotland many deaths occurred before patients reached hospital. This was unexpected as paracetamol usually causes death three to five days after ingestion. Further work revealed that the effect was probably due to the ingestion of the combination product co-proxamol (paracetamol with dextropropoxyphene). Further studies in Edinburgh confirmed dose-related abnormalities of the electrocardiogram which would predispose to ventricular arrhythmias and death<sup>4</sup>.

The evidence of risk in overdose and the lack of evidence that this painkiller was better than paracetamol alone led the UK licensing authority to withdraw co-proxamol from the market. NPIS research documented a rapid decline in mortality attributable to co-proxamol, subsequently confirmed by research in England or Wales. The net result is a saving in approximately 200 deaths annually<sup>5</sup>.

## 7.3 Antidepressants

Over the past decade there has been a major change in the management of psychiatric illness with the introduction of a range of new, potentially less hazardous antidepressants and antipsychotics. Understanding the toxicity of these drugs in overdose is, however, important in order that physicians may be appropriately advised on the best choice for patients at high risk of suicide, and in order to manage acute poisoning effectively.

1 Coulson J, Thompson JP. Paracetamol (acetaminophen) attenuates in vitro mast cell and peripheral blood mononucleocyte cell histamine release induced by N-acetylcysteine. *Clin Toxicol* 2010; 48:111–14.

2 Beer C, Pakravan K, Hudson M, Smith LT, Simpson K, Bateman DN, Thomas SHL. Frequency of liver unit admission following paracetamol overdose when paracetamol concentrations are below current United Kingdom treatment thresholds. *QJM* 2007; 100: 93–6.

3 Dear JW, Leelahavanichkul A, Aponte A, Hu X, Constant SL, Hewitt SM, Yuen PS, Star RA. Liver proteomics for therapeutic drug discovery: inhibition of the cyclophilin receptor CD147 attenuates sepsis-induced acute renal failure. *Crit Care Med* 2007; 35: 2319–29.

4 Afshari R, Maxwell SRJ, Dawson AH, Bateman DN. ECG abnormalities in co-proxamol (paracetamol/dextropropoxyphene) poisoning. *J Toxicol Clin Toxicol* 2005; 43: 255–9.

5 Sandilands EA, Bateman DN. Co-proxamol withdrawal has reduced suicide from drugs in Scotland. *Br J Clin Pharmacol* 2008; 66: 290–93.

Studies in Edinburgh have shown a clear differential between the toxicity of a range of antidepressant drugs taken in overdose. By examining changes in the ECG and collecting data on the rates of convulsions in overdose, it has been possible to categorise drugs within individual therapeutic groups as being more or less hazardous. We were thus able to show that venlafaxine and citalopram were more toxic than other drugs in their class and intermediate in toxicity between traditional tricyclic antidepressants and safer SSRIs<sup>1</sup>. We were also able to show that mirtazapine was the safest antidepressant when taken in overdose<sup>2</sup>.

## 7.4 Antipsychotic Drugs

Staff in NPIS Newcastle have been involved in research into arrhythmias caused by drug treatment during therapeutic use and after overdose. This research has demonstrated electrocardiographic abnormalities (QT interval prolongation) to be much more common with thioridazine and droperidol than with other antipsychotic drugs and that these effects are associated with an increased risk of sudden death in patients receiving these drugs in normal doses.

More recent research has studied the effects of genetic variations in liver metabolism on the cardiac effects of thioridazine. Although genetic variations affect the patterns of metabolites formed in users of thioridazine, the cardiac effects are similar because the metabolites have similar cardiac effects to the parent drug<sup>3,4</sup>.

A further large-scale study is being performed comparing cardiac effects and other clinical outcomes between different antipsychotics, including the newer atypical agents, after overdose.

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1 Kelly CA, Dhaun N, Laing EJ, Strachan FE, Good AM, Bateman DN. Comparative toxicity of citalopram and the newer antidepressants after overdose. *J Toxicol Clin Toxicol* 2004; 42: 67–71.

2 Waring WS, Good AM, Bateman DN. Lack of significant toxicity after mirtazapine overdose: a five-year review of cases admitted to a regional toxicology unit. *Clin Toxicol* 2007; 45: 45–50.

3 Salih ISM, Thanacoody RHK, McKay GA, Thomas SHL. Comparison of the effects of thioridazine and mesoridazine on the QT interval in healthy adults after single oral doses. *Clin Pharmacol Ther* 2007; 82: 548–54.

4 Thanacoody RHK, Daly AK, Reilly JG, Ferrier IN, Thomas SHL. Factors affecting drug concentrations and QT interval during thioridazine therapy. *Clin Pharmacol Ther* 2007; 82: 555–65.

## 7.5 Heavy Metal Poisoning

NPIS Birmingham, in association with the West Midlands Poisons Unit at City Hospital, has been involved in the clinical evaluation of antidotes for heavy metal poisoning. Specifically, the units have published in 2009 the largest case series of patients treated with DMSA (dimercaptosuccinic acid) in adult lead poisoning which had comprehensive data on blood and urine lead concentrations<sup>5</sup>. This was accompanied by two detailed reviews<sup>6,7</sup>.

## 7.6 Pesticides

In addition to acute poisonings, staff contributing to the NPIS have interests in both acute and longer-term environmental and occupational exposures to chemicals, including pesticides and veterinary medicines.

Studies in Edinburgh have focused on pesticide toxicity in Asia, where high rates of death are caused by intentional pesticide overdose. This work has included large clinical trials of activated charcoal and specific antidotes which have informed the management of poisoning worldwide<sup>8,9</sup>. In addition, public health programmes have been developed and shown to successfully reduce the number of deaths by removing more toxic pesticides from the marketplace<sup>10</sup>.

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5 Bradberry S, Sheehan T, Vale A. Use of oral dimercaptosuccinic acid (succimer; DMSA) in adult patients with inorganic lead poisoning. *QJM* 2009; 102: 721–32.

6 Bradberry S, Vale A. Dimercaptosuccinic acid (succimer; DMSA) in inorganic lead poisoning. *Clin Toxicol* 2009; 47: 617–31.

7 Bradberry SM, Vale JA. A comparison of sodium calcium edetate (edetate calcium disodium) and succimer (DMSA) in the treatment of inorganic lead poisoning. *Clin Toxicol* 2009; 47: 841–58.

8 Eddleston M, Juszczak E, Buckley NA, Senarathna L, Mohamed F, Dissanayake W, Hittarage A, Azher S, Jegannathan K, Jayamanne S, Sheriff MR, Warrell DA; Ox-Col Poisoning Study collaborators. Multiple-dose activated charcoal in acute self-poisoning: a randomised controlled trial. *Lancet* 2008; 16: 371(9612): 579–87.

9 Eddleston M, Eyer P, Worek F, Juszczak E, Alder N, Mohamed F, Senarathna L, Hittarage A, Azher S, Jegannathan K, Jayamanne S, von Meyer L, Dawson AH, Sheriff MH, Buckley NA. Pralidoxime in acute organophosphorus insecticide poisoning – a randomised controlled trial. *PLoS Med* 2009; 30: 6(6).

10 Gunnell D, Fernando R, Hewagama M, Priyangika WD, Konradsen F, Eddleston M. The impact of pesticide regulations on suicide in Sri Lanka. *Int J Epidemiol* 2007; 36: 1235–42.

In the UK concern has been raised over the possible toxicity of products used to control parasites on sheep, and indeed for a while some of these products were withdrawn from the market. Staff from the Cardiff unit, together with research colleagues from London and Manchester, have undertaken the largest study of its kind investigating the potential effect on health of using sheep dips.

The aim of the study was to determine the nature and frequency of signs of ill-health amongst farmers treating sheep, and to determine whether those farmers who developed flu-like symptoms differed in their exposure to organophosphorus (OP) compounds, endotoxins and infectious agents when compared with other farmers operating at the same time who remained free of symptoms.

A total of 781 farmers were recruited and interviewed for the study. Although 7% of farmers felt ill on the day prior to dipping, this fell to 3% during the first three days after dipping and even lower later in the week. Symptoms were less likely to be reported by farmers holding a certificate of competence.

Few farmers (less than 2%) were identified as having 'dippers' flu'. The increased symptom reporting found during the study was unlikely to have resulted from any of the exposures examined and further work would be required to identify the cause of the increased symptom reporting<sup>1</sup>.

## 7.7 Drug Exposure in Pregnancy

UKTIS has been collecting data on pregnancy outcomes following exposure to medicines and chemicals in pregnancy for many years and publishes information relating to individual agents when the data are sufficient.

### A/H1N1v influenza in pregnancy

During 2009/10, the emergence of the pandemic of A/H1N1v influenza ('swine flu') focused research efforts on establishing the maternal and fetal effects of the infection, the antiviral drugs used as treatment and prophylaxis, and the safety of the new vaccines used for prevention.

A collaborative venture with the UK Obstetric Surveillance System (UKOSS) was initially commissioned for six months by the National Institute for Health Research (NIHR) as high priority expedited research to collect prospective observational data on pregnant women exposed to swine flu and/or antiviral medication, managed in both primary (UKTIS) and secondary (UKOSS) care. Monthly review of emerging data from this study was provided to the NIHR to inform guidance on the management of A/H1N1v infection in pregnancy during the 2009 pandemic such that outcomes for women and infants were optimised during this period. By comparing pregnant women with influenza symptoms with a control group of uninfected women, a two-fold increase in risk of GP presentation has been shown in women with asthma.

Additional funding has subsequently been provided to the Newcastle upon Tyne Hospitals NHS Foundation Trust (NUTH) by the swine flu vaccine manufacturers, GSK and Baxter, to include women offered swine flu vaccination in pregnancy in the UKTIS arm of the study. The study is still recruiting, with over 2700 women reported to UKTIS to date. It is recognised globally that there is a pressing need for good data on maternal and longer term fetal outcomes following influenza, antiviral or vaccine exposure in pregnancy, not only in view of the likelihood that A/H1N1v will remain the dominant circulating influenza strain during the winter of 2010, but also given the likelihood of other, potentially more virulent influenza outbreaks in the future.

The study is currently due to run until April 2011, at which stage data on pregnancy outcome and infant development and health at the age of six months will be available for analysis. Interim results of this research have been published<sup>2</sup>.

### Pharmacoepidemiological research on outcomes of therapeutics (PROTECT)

UKTIS is one of 20 centres led by the European Medicines Agency involved in a European-wide pharmacovigilance research project. The consortium will develop and test

1 Povey AC, Rees HG, Thompson JP, Karaliedde L. Prospective cohort study of sheep dip exposure and 'dipper's flu'. RR775. HSE Books, 2010.

2 Yates L, Pierce M, Stephens S, Mill AC, Spark P, Kurinczuk JJ, Brocklehurst P, Thomas SHL, Knight M. Influenza A/H1N1v in pregnancy: an investigation of the characteristics and management of affected women and the relationship to pregnancy outcomes for mother and infant. Health Technology Assessment 2010; 14: 109–82.

methods of proactive monitoring of drug safety using expertise from UKTIS and other centres in the EU. UKTIS is involved in a pilot project to collect data directly from pregnant patients to improve the way in which adverse drug reporting data are collected.

## Epigenetic signatures of teratogenesis in the human embryo

UKTIS has secured NIHR Flexibility and Sustainability Funding to produce pilot data towards a larger project grant application. This will involve the collection of baseline data on 'normal' methylation patterns in the developing human fetus at various time points during pregnancy. Further funding to compare these data with methylation signals in fetuses exposed to drugs or other environmental chemicals will be sought, with the aim of identifying teratogenic signatures resulting from such exposures, offering the potential of improved insight into teratogenic mechanisms, and better methods for predicting the effects of drugs and chemicals on the fetus.

## 8 Conclusions

This review of the NPIS for 2009/10 confirms that all components of the service continue to work well as an integrated national network. The number of enquiries from all sources appears to be plateauing. The successful collaborative working of the NPIS units is illustrated by the increase in entries on the TOXBASE database edited, reviewed and written this year. In addition, paediatric consultants now routinely participate in the review of relevant TOXBASE entries.

While there has been a welcome expansion in the number of consultants who are now available to support the out-of-hours service, all the cover is provided by eight full-time-equivalent consultants working part-time for the NPIS, which serves the whole of the UK on a 24-hour-a-day basis – a most cost-effective service model.

Stakeholder feedback demonstrates a continuous high level of user satisfaction with TOXBASE, the telephone information services provided by the NPIS and UKTIS, and with the advice provided by NPIS consultants. Feedback from TOXBASE users has also enabled specific improvements in the database to be made.

This year's report illustrates some of the public health areas that NPIS data have the potential to support. There was an increase in the numbers of enquiries that involve new cathinone drugs of misuse. New agents continue to present – the NPIS monitors these and TOXBASE entries are developed to support frontline NHS staff.

2009/10 marked the fifth year of networked arrangements for the NPIS units, following establishment of a common NPIS rota in 2005. This has increased the efficiency of the service by more collaborative working between units and improved the consistency of its advice. The clinical governance review in the early years set a useful strategic direction to underpin the development of common processes and operating procedures. Continued professional development programmes are now established for all staff.

Many enquiries about children relate to exposures at home to household products. A detailed project was undertaken and key findings are included in this report. A common exposure was to 'liquitabs'. These were associated with acute eye symptoms and unusually some cases of sedation after ingestion.

The phased withdrawal of co-proxamol has allowed the NPIS to assess the effect of this action in reducing poisons enquiries over time. These NPIS data are more rapidly available than other public health data, as they are collected and can be analysed in near real time.

An increased risk of adverse fetal outcomes following maternal exposures or overdose cannot be excluded for many substances, as available data on pregnancy outcome are limited. UKTIS continues to collect these data to make available to healthcare professionals to help guide their clinical decisions.

## 9 Recommendations

### Recommendations and Outcomes for 2009/10

- 1 To review and further develop stakeholder feedback and quality assurance on all aspects of the NPIS  
**Outcome** Review conducted and quality assurance systems of all aspects of the NPIS and UKTIS confirmed as 'fit for purpose', including user feedback on TOXBASE.
- 2 To establish a forum with partner agencies to consider what further steps could be taken to prevent poisoning, including developing a framework for the provision of such advice for the general public.  
**Outcome** Deferred due to financial constraints and funding uncertainties.
- 3 To continue to develop 'short advice boxes' on the most common and potentially most toxic ingestions as part of the ongoing TOXBASE editing process in the absence of specific funding to accelerate this activity  
**Outcome** Achieved and ongoing work programme continued
- 4 To increase the profile of UKTIS amongst clinical user groups  
**Outcome** Profile increased with key user groups by relaunch of UKTIS and publicity associated with the A/H1N1v influenza pandemic. Further developments planned for 2010/11
- 5 To plan a second meeting with major funding bodies and stakeholders to review the current NPIS provision and establish their priorities for the service  
**Outcome** Meeting deferred due to recent constraints

### Recommendations for 2010/11

- 1 To work to ensure that future NPIS and UKTIS commissioning arrangements are appropriate and consistent with the evolving policy for public health
- 2 To ensure arrangements are appropriate to enable the NPIS and UKTIS to provide optimal support to the London 2012 Olympic Games

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Scottish Senior Clinical Research Fellow, University of Edinburgh, and Honorary Consultant Physician, Royal Infirmary of Edinburgh

#### Dr A Veiraiah MB BS MRCP

Consultant Clinical Toxicologist and Physician, Royal Infirmary of Edinburgh

## NPIS Newcastle (including UKTIS)

#### Dr H K R Thanacoody MD FRCPE

Consultant Physician and Clinical Toxicologist, Royal Victoria Infirmary, and Honorary Senior Clinical Lecturer, Institute of Cellular Medicine, Newcastle University

#### Professor S H L Thomas BSc MD FRCP FRCPE

Director, NPIS Newcastle and UKTIS, and Consultant Physician, Newcastle Hospitals NHS Foundation Trust, and Professor of Clinical Pharmacology and Therapeutics, Newcastle University

#### Dr L Yates MBChB DRCOG MRCPCH PhD

Head of Teratology, UKTIS, and Consultant in Clinical Genetics

## Consultants also providing on-call support for the NPIS

#### Dr P I Dargan MBBS FRCPE FACMT

Consultant Physician and Clinical Toxicologist and Clinical Director, Guy's and St Thomas' NHS Foundation Trust and King's Health Partners, London

#### Dr W S Waring BMedSci MB PhD FRCPE

Consultant Physician in Acute Medicine and Toxicology, York Hospital, and Honorary Senior Lecturer in Medicine, Hull York Medical School, York

#### Dr D M Wood BSc(Hons) MBChB(Hons) MRCP MD

Consultant Physician and Clinical Toxicologist, Guy's and St Thomas' NHS Foundation Trust and King's Health Partners, London

## Consultants providing specialist paediatric support for the NPIS

#### Dr T Beattie MB MSc FRSCed(A&E) FCEM FRCPE FFSEM FFSEM(RCPSI) DCH

Consultant in Paediatric Emergency Medicine, Royal Hospital for Sick Children, Edinburgh

#### Dr D Bloomfield MB BS MRCPCH

Consultant in Paediatric Emergency Medicine, Royal Hospital for Sick Children, Edinburgh



## National and International Appointments of NPIS Affiliated Staff

NPIS staff have a role in supporting many important aspects of toxicology, both nationally and internationally. These include advisory roles to international and national bodies, including government, as well as academic activities. The range of their roles presented below provides a flavour of these activities and indicates the wider 'added value' of the NPIS.

### NPIS Birmingham

#### Dr S M Bradberry

##### INTERNATIONAL ACTIVITIES

Board Member: European Association of Poison Centres and Clinical Toxicologists

Scientific Committee Member: European Association of Poison Centres and Clinical Toxicologists

##### INTERNATIONAL SOCIETIES

Member: European Association of Poison Centres and Clinical Toxicologists

Member: American Academy of Clinical Toxicology

##### INTERNATIONAL JOURNALS

Senior Editorial Board Member: Clinical Toxicology

##### ADVISORY COMMITTEES

Member: Health and Safety Executive Pesticide Incident Appraisal Panel

##### UK ACADEMIC ACTIVITIES

Honorary Lecturer: School of Biosciences, University of Birmingham

Joint Course Organiser: MSc (Toxicology), University of Birmingham

Educational Supervisor: Sandwell and West Birmingham Hospitals NHS Trust

Member: British Toxicology Society

Member: Society of Occupational Medicine

#### Professor J A Vale

##### INTERNATIONAL ACTIVITIES

Member: Advisory Board Hong Kong Poisons Centre

##### INTERNATIONAL SOCIETIES

Fellow: American Academy of Clinical Toxicology

Member: European Association of Poison Centres and Clinical Toxicologists

Member: Society of Toxicology

American Academy of Clinical Toxicology: Lifetime Achievement Award Lecturer

##### INTERNATIONAL JOURNALS

Reviews Editor: Clinical Toxicology

Editorial Board Chairman: Medicine

Editorial Board Member: Drugs

##### ADVISORY COMMITTEES

Chairman: Ministry of Defence Research Ethics Committee

Member: MHRA Clinical Trials Collaboration Group

Consultant: Dstl Porton Down

Member: Expert Advisory Group on Management of Casualties Caused by Chemical Terrorism (Blain II)

Member: National Patient Safety Board: Medication Safety Board

##### UK ACADEMIC ACTIVITIES

Joint Course Organiser: MSc (Toxicology), University of Birmingham

Examiner: MRCP Part 2 Clinical Examination (PACES)

External Examiner: Cardiff University

Examiner: Faculty of Occupational Medicine

Member: British Pharmacological Society

Fellow: British Toxicology Society

Member: Society of Occupational Medicine

Fellow: Faculty of Occupational Medicine

### NPIS Cardiff

#### Dr C V Krishna

##### ADVISORY COMMITTEES

Chairman: All Wales Specialist Training Committee in Clinical Pharmacology and Therapeutics

Member: New Medicines Group, All Wales Medicines Strategy Committee

##### UK NHS COMMITTEES

Senior Medical Officer: Yellow Card Centre (Wales)

##### UK ACADEMIC ACTIVITIES

Deputy Course Coordinator: Certificate/Diploma/MSc in Medical Toxicology, Cardiff University

Member: Steering Committee, Diploma in Therapeutics, Cardiff University

Member: Steering Committee, Diploma/MSc in Therapeutics, Cardiff University

#### Professor P A Routledge

##### INTERNATIONAL ACTIVITIES

Associate Director: World Health Organization Clearing House for Chemical Incidents, Cardiff, Wales

##### INTERNATIONAL JOURNALS

Editorial Board Member: Adverse Reactions and Acute Poisoning Reviews

Editorial Board Member: Adverse Drug Reactions Bulletin

##### ADVISORY COMMITTEES

Chairman: UK Herbal Medicines Advisory Committee

Chairman: All-Wales Medicines Strategy Group

Consultant Advisor in Toxicology to the Chief Medical Officer (Wales)

#### UK ACADEMIC ACTIVITIES

President Elect: British Pharmacological Society  
External Advisory Board Member: Liverpool School of Biomedical Sciences  
Chairman: All Wales Specialist Training Committee in Clinical Pharmacology  
Course Director: Postgraduate Diploma/MSc Programmes in Medical Toxicology, Therapeutics and Occupational Health, Cardiff University  
Faculty Lead: Medicines Management, 1000 Lives Plus Campaign, Wales  
Honorary Secretary: Clinical Pharmacology Colloquium

#### Dr A Thomas

##### ADVISORY COMMITTEES

Member: New Medicines Group, All Wales Medicines Strategy Committee  
Member: All-Wales Specialist Training Committee in Clinical Pharmacology

##### UK NHS COMMITTEES

Deputy Director: Yellow Card Centre Wales

##### UK ACADEMIC ACTIVITIES

Member: Steering Committee, Diploma/MSc in Medical Toxicology, Cardiff University  
Member: Steering Committee, Diploma in Therapeutics, Cardiff University

#### Dr J P Thompson

##### INTERNATIONAL ACTIVITIES

Member: Advisory Board Hong Kong Poisons Centre

##### INTERNATIONAL SOCIETIES

Chair: Human Toxicology Section British Toxicology Society  
Member: Clinical Section Committee, British Pharmacological Society  
Member: American Academy of Clinical Toxicology  
Member: European Association of Poison Centres and Clinical Toxicologists

##### ADVISORY COMMITTEES

Member: Appraisal Panel for Suspected Adverse Reactions to Veterinary Medicines  
Member: Expert Advisory Group on Management of Casualties Caused by Chemical Terrorism (Blain II)  
Member: New Medicines Group, All Wales Medicines Strategy Committee  
Senior Medical Officer: Yellow Card Centre (Wales)  
Member: All-Wales Specialist Training Committee in Clinical Pharmacology

##### UK ACADEMIC ACTIVITIES

Member: Specialist Question Writing Group for Clinical Pharmacology and Therapeutics of the Royal College of Physicians  
Course Coordinator: Certificate/Diploma/MSc in Medical Toxicology, Cardiff University  
Member: Steering Committee, Diploma in Therapeutics, Cardiff University  
Member: Steering Committee, MSc in Occupational Health, Policy and Practice, Cardiff University

#### NPIS Edinburgh

#### Professor D N Bateman

##### INTERNATIONAL ACTIVITIES

Advisor: World Health Organization/International Programme on Chemical Safety

##### INTERNATIONAL SOCIETIES

Member: European Association of Poisons Centres and Clinical Toxicologists  
Scientific Committee Member: European Association of Poisons Centres and Clinical Toxicologists  
Fellow: American Academy of Clinical Toxicology

##### INTERNATIONAL JOURNALS

Editor in Chief: Clinical Toxicology

##### ADVISORY COMMITTEES

Member: Pharmacovigilance Expert Advisory Group, Medicines and Healthcare products Regulatory Agency  
Member: Expert Advisory Group on Management of Casualties Caused by Chemical Terrorism (Blain II)  
Member: Pesticides Adverse Health Effects Surveillance Working Group of the Advisory Committee on Pesticides

##### UK NHS COMMITTEES

Board Member: Yellow Card Centre (Scotland)  
Expert Toxicology Advisor: Scottish Government

##### UK ACADEMIC ACTIVITIES

Training Programme Director for Scotland's Clinical Pharmacology and Therapeutics Programme (from Aug 2009)  
Member of Executive: British Toxicological Society (until April 2010)  
Member: British Pharmacology Society  
Board Member: Joint Royal Colleges MRCP (Part 1) Examining Board (until Nov 2009)  
Board Member: Joint Royal Colleges MRCP (Part 1) Standard Setting Group (until Nov 2009)

#### Dr J Dear

##### INTERNATIONAL SOCIETIES

Member: European Association of Poison Centres and Clinical Toxicologists

##### UK NHS COMMITTEES

Member: Lothian Formulary Committee

##### UK ACADEMIC ACTIVITIES

Reviewer: Clinical Toxicology, European Journal of Clinical Pharmacology, British Journal of Pharmacology  
Tutor: MSc in Translational Medicine, Edinburgh University  
External Examiner: MRes in Translational Medicine, Newcastle University  
Member: British Pharmacological Society  
Member: Clinical Pharmacology Specialty Question Group, MRCP(UK)

## Dr M Eddleston

### INTERNATIONAL ACTIVITIES

Advisor: World Health Organization/Department of Mental Health

### INTERNATIONAL SOCIETIES

Board Member: Asia Pacific Association of Medical Toxicology

Member: European Association of Poison Centres and Clinical Toxicologists

### UK ACADEMIC ACTIVITIES

Member: Association of Physicians of Great Britain and Ireland

Member: British Pharmacology Society

Member: British Toxicological Society

Member: Royal Society of Tropical Medicine and Hygiene

## Mrs A M Good

### INTERNATIONAL SOCIETIES

General Secretary: European Association of Poisons Centres and Clinical Toxicologists

## Dr A Veiraiah

### INTERNATIONAL SOCIETIES

Member: European Association of Poison Centres and Clinical Toxicologists

## NPIS Newcastle

### Dr H K R Thanacoody

#### INTERNATIONAL SOCIETIES

Member: European Association of Poison Centres and Clinical Toxicologists

#### ADVISORY COMMITTEES

Member: Independent Scientific Advisory Committee, Medicines and Healthcare products Regulatory Agency

#### UK ACADEMIC ACTIVITIES

Member: Question Writing Group: Joint Royal Colleges MRCP (Part 1) Examining Board

Module Leader: Diploma in Therapeutics and MRes Experimental Medicine and Therapeutics, Newcastle University

## Professor S H L Thomas

### INTERNATIONAL SOCIETIES

President-elect: European Association of Poisons Centres and Clinical Toxicologists

Expert Panel Member: European Medicines Agency

### INTERNATIONAL JOURNALS

Senior Editorial Board Member: Clinical Toxicology

International Editorial Board Member: British Journal of Clinical Pharmacology

### ADVISORY COMMITTEES

Member: Commission for Human Medicines

Member: Technical Committee, Advisory Council on the Misuse of Drugs

Member: Expert Advisory Group on Management of Casualties Caused by Chemical Terrorism (Blain II)

Member: Ministry of Defence Advisory Committee on Military Medicine

Member: Ministry of Defence Research Ethics Committee

### UK NHS COMMITTEES

Director: Yellow Card Centre Northern and Yorkshire

Medical Director: Regional Drug and Therapeutics Centre, Newcastle

### UK ACADEMIC ACTIVITIES

Chair: Specialist Training Committee, Clinical Pharmacology and Therapeutics, Northern Deanery

Degree Programme Director: Certificate/Diploma in Therapeutics, Newcastle University

## Consultants also providing on-call support for the NPIS

### Dr P I Dargan

#### INTERNATIONAL ACTIVITIES

Adviser: World Health Organization/International Programme on Chemical Safety

Adviser: US Food and Drug Administration (FDA): attended and presented at an FDA Advisory Committee June 2009

Adviser: European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)

#### INTERNATIONAL SOCIETIES

Member: International Advisory Board of the Indian Society of Toxicology

Vice Chairman: American College of Medical Toxicology (ACMT) International Committee.

Scientific Committee Member: European Association of Poisons Centres and Clinical Toxicologists

#### INTERNATIONAL JOURNALS

Editorial Board Member: Quarterly Journal of Medicine

Editorial Board Member: Case Reports in Medicine

#### ADVISORY COMMITTEES

Member: London Ambulance Service Clinical Audit and Research Steering Group

Co-chair: College of Emergency Medicine Antidote Guidelines Group

Adviser: Home Office Advisory Council on the Misuse of Drugs

Adviser: Department of Health UK Focal Point on Drugs

Expert Advisory Panel: Medicines and Healthcare products Regulatory Agency Steering Group: National Programme for Substance Abuse Deaths

#### UK ACADEMIC ACTIVITIES

Member: King's College London Phase 5 Exam Board

Examiner: King's College London MPharm

Examiner: MRCP Part 2 Clinical Examination (PACES)



## Dr W S Waring

### INTERNATIONAL JOURNALS

Associate Editor: Therapeutic Advances in Drug Safety

Editorial Advisory Board member: Recent Patents on Cardiovascular Drug Discovery

Editorial Board Member: European Journal of Clinical Pharmacology

Editorial Board Member: Expert Review of Clinical Pharmacology

### ADVISORY COMMITTEES

Member: Independent Review Panel for Borderline Products (MHRA)

Member: Independent Review Panel for Advertising (MHRA)

Member: Advisory Committee on Pesticides (Defra)

Member: Medical Toxicology Panel (Defra)

### UK ACADEMIC ACTIVITIES

Educational Lead: National Poisons Information Service CPD programme

Examiner: MRCP Part 2 Clinical Examination (PACES)

External Examiner: Certificate and Diploma in Clinical Pharmacology, Newcastle University

Member: Specialist Advisory Committee in Toxicology (RCPPath)

Member: Clinical Section Committee, British Pharmacology Society

## Dr D M Wood

### INTERNATIONAL ACTIVITIES

Adviser: European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)

### INTERNATIONAL SOCIETIES

European Regional Director: American College of Medical Toxicology (ACMT) International Committee.

Abstract Reviewer: European Association of Poisons Control Centres and Clinical Toxicologists Annual Meeting

### ADVISORY COMMITTEES

Adviser: Home Office Advisory Council on the Misuse of Drugs

Adviser: Department of Health UK Focal Point on Drugs

Over 110 contributions to the scientific literature were published in 2009/10 by staff working in association with the NPIS.

## Peer-reviewed Papers

- Bell CL, Watson B, Waring WS. Acute psychosis caused by co-amoxiclav. *Praxis* 2009; 98: 765–6.
- Bishop CR, Dargan PI, Greene SL, Garnham F, Wood DM. Emergency Department presentations with suspected Acute Coronary Syndrome – frequency of self-reported cocaine use and its associated clinical features. *Eur J Emerg Med* 2010; 17: 164–6.
- Bradberry SM, Sheehan TMT, Barracough CR, Vale JA. DMPS can reverse the features of severe mercury vapor-induced neurological damage. *Clin Toxicol* 2009; 47: 894–8.
- Bradberry S, Sheehan T, Vale A. Use of oral dimercaptosuccinic acid (succimer; DMSA) in adult patients with inorganic lead poisoning. *QJM* 2009; 102: 721–32.
- Bradberry S, Vale A. Dimercaptosuccinic acid (succimer; DMSA) in inorganic lead poisoning. *Clin Toxicol* 2009; 47: 617–31.
- Bradberry SM, Vale JA. A comparison of sodium calcium edetate (edetate calcium disodium) and succimer (DMSA) in the treatment of inorganic lead poisoning. *Clin Toxicol* 2009; 47: 841–58.
- Campbell G, Leitch D, Lewington AJP, Dargan PI, Baker RJ. Minimal change nephrotic syndrome due to occupational mercury vapor inhalation. *Clin Nephrol* 2009; 72: 216–19.
- Coulson J, Thompson JP. Paracetamol (acetaminophen) attenuates in vitro mast cell and peripheral blood mononucleocyte cell histamine release induced by N-acetylcysteine. *Clin Toxicol* 2010; 48: 111–14.
- Dargan PI, Button JS, Davies S, Ramsey J, George S, Holt D, Wood DM. First reported UK fatality due to gamma-butyrolactone (GBL). *J Roy Soc Med* 2009; 102: 546–7.
- Doak MW, Nixon AC, Lupton DJ, Waring WS. Self-poisoning in older adults: patterns of drug ingestion and clinical outcomes. *Age Ageing* 2009; 38: 407–11.
- Eddleston M, Eyer P, Worek F, Juzszak, Alder N, Mohamed F, Senarathna L, Hittarage A, Azher S, Jegannathan K, Jayamanne S, von Meyer L, Dawson AH, Sheriff MHR, Buckley NA. Pralidoxime in acute organophosphorus insecticide poisoning – a randomised controlled trial. *PLoS Med* 2009; 6: e1000104.
- Eddleston M, Gunnell D, von Meyer L, Eyer P. Relationship between blood alcohol concentration on admission and outcome in dimethoate organophosphorus self-poisoning. *Br J Clin Pharmacol* 2009; 68: 916–19.
- Eddleston M, Worek F, Eyer P, Thiermann H, von Meyer L, Jegannathan K, Sheriff MHR, Dawson AH, Buckley NA. Poisoning with the S-alkyl organophosphorus insecticides profenofos and prothiofos. *QJM* 2009; 102: 785–92.
- Eyer F, Roberts DM, Buckley NA, Eddleston M, Thiermann H, Worek F, Eyer P. Extreme variability in the formation of chlorpyrifos oxon in patients poisoned by chlorpyrifos. *Biochem Pharmacol* 2009; 78: 531–7.
- Ferguson LP, Dargan PI, Hood JL, Tibby SM. Life-threatening organ failure following lamotrigine therapy. *Pediatr Neurol* 2009; 40: 392–4.
- Gratus C, Damery S, Wilson S, Warmington S, Routledge P, Grieve R, Steven N, Jones J, Greenfield S. The use of herbal medicines by people with cancer in the UK: a systematic review of the literature. *QJM* 2009; 102: 831–42.
- Hill S, Thomas SHL. What's new in... Toxicity of drugs of abuse? *Medicine* 2009; 37: 621–6.
- John H, Eddleston M, Clutton RE, Worek F, Thiermann H. Simultaneous quantification of the organo-phosphorus pesticides dimethoate and omethoate in porcine plasma and urine by LC–ESI-MS/MS and flow-injection-ESI-MS/MS. *J Chromatogr B* 2010; 878: 1234–45.
- Li Y, Yu X, Wang Z, Ma S, Sun C, Qiu Z, Eddleston M. Clinical toxicology in China: current situation and future development. *Clin Toxicol* 2009; 47: 263–9.
- Mohamed F, Gawarammana I, Robertson TA, Roberts MS, Palangasinghe C, Zawahir S, Jayamanne S, Jegannathan K, Eddleston M, Buckley NA, Dawson AH, Roberts DM. Acute human self-poisoning with imidacloprid compound: a neonicotinoid insecticide. *PLoS ONE* 2009; 4: e5127.
- Mohamed F, Manuweera G, Gunnell D, Azher S, Eddleston M, Dawson A, Konradsen F. Pattern of pesticide storage before pesticide self-poisoning in rural Sri Lanka. *BMC Public Health* 2009; 9: 405.
- Ovaska H, Ludman A, Wood DM, Spencer E, Jones AL, Dargan PI. Propafenone poisoning – a case report with toxicokinetic data. *J Med Toxicol* 2010; 6: 37–40.
- Roberts DM, Buckley NA, Mohamed F, Eddleston M, Goldstein DA, Mehrsheikh A, Bleake MS, Dawson AH. A prospective observational study of the clinical toxicology of glyphosate-containing herbicides in adults with acute self-poisoning. *Clin Toxicol* 2010; 48: 129–36.
- Sandilands EA, Good AM, Bateman DN. The use of atropine in a nerve agent response with specific reference to children: are current guidelines too cautious? *Emerg Med J* 2009; 26: 690–94.
- Schep LJ, Slaughter RJ, Vale JA, Beasley DM. A seaman with blindness and confusion. *Br Med J* 2009; 339: b3929.
- Shihana F, Dissanayake DM, Dargan P, Dawson AH. A modified low cost colourimetric method for paracetamol (acetaminophen) measurement in plasma. *Clin Toxicol* 2010; 48: 42–6.
- Stephens S, Wilson G. Principles in pregnant women: guide to general principles. *Prescriber* 2009; 20: 43–6.
- Street JM, Dear JW. The application of mass spectrometry based protein biomarker discovery to theragnostics. *Br J Clin Pharmacol* 2010; 69: 367–78.
- Thanacoody RH. Extracorporeal elimination in acute valproic acid poisoning. *Clin Toxicol* 2009; 47: 609–16.
- Thanacoody RH, Jay J, Sherval J. The association between drug related deaths and prior contact with hospital-based services. *Scot Med J* 2009; 54: 7–10.

Veiraiah A, Routledge PA. Adverse reaction to anticoagulants. *Adverse Drug Reaction Bull* 2009; 258: 991–4.

Walker J, White R, Vale A, Elliott S, Wass J, Reynolds J. Unexplained severe hypoglycaemia in hospital: a difficult diagnostic challenge. *Br J Clin Pharmacol* 2009; 67: 266–7.

Waring WS. Lamotrigine overdose associated with generalised seizures. *BMJ Case Rep* 2009; bcr0720080489.

Waring WS. Onset and recovery of hepatic and renal injury after deliberate acute paracetamol overdose. *BMJ Case Rep* 2009; bcr0820080806.

Waring WS, Jamie H, Leggett GE. Delayed onset of acute renal failure after significant paracetamol overdose: a case series. *Hum Exp Toxicol* 2010; 29: 63–8.

Waring WS, Laing WJ, Good AM, Malkowska AM. Acute caffeine ingestion: clinical features in patients attending the Emergency Department and Scottish Poison Centre enquiries between 2000 and 2008. *Scot Med J* 2009; 54: 3–6.

Waring WS, McDonald SH, Good AM, Gordon LD, Bateman DN. Interpretation of clinical guidelines for poisoned patients: positive and negative effects of standard phrases used in TOXBASE. *Eur J Clin Pharmacol* 2009; 65: 1007–12.

Waring WS, Nixon AC. Acute liver impairment after sodium valproate overdose. *BMJ Case Rep* 2009; bcr0620080057.

Wong E, Taylor Z, Thompson J, Tuthill D. A simplified gentamicin dosing chart is quicker and more accurate for nurse verification than the BNFC. *Arch Dis Child* 2009; 94: 542–5.

Wood DM, Dargan PI. Putting cocaine use and cocaine associated cardiac arrhythmias into an epidemiological and clinical perspective. *Br J Clin Pharmacol* 2010; 69: 443–7.

Wood DM, Dargan PI, Hoffman RS. Management of cocaine induced cardiac arrhythmias due to cardiac ion dysfunction. *Clin Toxicol* 2009; 47: 14–23.

Wood DM, Looker J, Shaikh L, Button J, Lidder S, Ramsey J, Holt D, Dargan PI. Seizures associated with recreational use of Bromo-dragonFLY. *J Med Toxicol* 2009; 5: 226–9.

Wood DM, Nicolau M, Dargan PI. Epidemiology of recreational drug toxicity in a nightclub environment. *Substance Use Misuse* 2009; 44: 1495–502.

Yates L, Pierce M, Stephens S, Mill AC, Spark P, Kurinczuk JJ, Brocklehurst P, Thomas SHL, Knight M. Influenza A/H1N1v in pregnancy: an investigation of the characteristics and management of affected women and the relationship to pregnancy outcomes for mother and infant. *Health Technology Assessment* 2010; 14(34): 109–82.

Zawahir MS, Ashrafdeen M, Palagasinge C, Mohamed F, Eddleston M, Dawson A, Buckley N and Gawarammana I. Acute intentional self-poisoning with a herbicide product containing fenoxaprop-P-ethyl, ethoxysulfuron and isoxadifen ethyl – a prospective observational study. *Clin Toxicol* 2009; 47: 792–7.

## Book Chapters

Bateman DN, Marrs TC. Antidotal studies. In: Ballantyne B, Marrs T, Syversen T (eds), *General and Applied Toxicology* (3 edn). John Wiley & Sons Ltd, 2009; pp 809–22.

Bradberry S, Vale A. Biotoxins and xenobiotics. In: Ayres J (ed), *Textbook of Environmental Medicine*. Hodder Arnold, 2010.

Clarke SFJ, Torok R, Dargan PI, Jones AL. Emergency room use of opioid antagonists in drug intoxication and overdose. In: Dean R, Bilsky EJ, Negus SS (eds), *Opioid Receptors and Antagonists: from Bench to Clinic*. Humana Press, 2009, pp 511–39.

Thomas SHL, White J. Poisoning. In: Colledge NR, Walker BR, Ralston RH (eds), *Davidson's Principles and Practice of Medicine* (21 edn). Churchill Livingstone, 2010.

Thompson JP. Toxicology of substances that affect performance and behaviour. In: Ballantyne B, Marrs T, Syversen T (eds). *General and Applied Toxicology* (3 edn). John Wiley & Sons Ltd, 2009, pp 3355–64.

Waring WS. Poisoning and drug overdose. In: McKay GA, Reid JL, Walters MR (eds), *Clinical Pharmacology and Therapeutics (Lecture Notes)* (8 edn). Wiley-Blackwell, 2010.

## Published Congress Abstracts

Adams RD, Lupton D, Good AM, Bateman DN. Comparison of poisoning severity grades allocated by enquirers and poisons information staff in pesticide exposures. *Clin Toxicol* 2009; 47: 487–8.

Aresti K, Ilankoon Y, Dargan PI, Wood DM. Audit of the legibility of prescribing in patients admitted to acute general medical admitting wards in a large inner city hospital. *Basic Clin Pharmacol Toxicol* 2009; 105(Suppl 1): 135.

Bateman DN, Sandilands E. Poisoning in specialist patient groups: the elderly. *Clin Toxicol* 2009; 47: 436–7.

Bishop CR, Greene SI, Dargan PI, Wood DM. Frequency of self-reported cocaine use in patients presenting to a large inner-city European Emergency Department with chest pain. *Clin Toxicol* 2009; 47: 452.

Bosanquet A, Dyas J, Veiraiah A, Krishna C, Thompson JP. A case of mirtazapine induced dystonia. *Clin Toxicol* 2009; 47: 733.

Bradberry S. When and why is chromium carcinogenic? *Clin Toxicol* 2009; 47: 468.

Button J, Davies S, Dargan PI, Wood DM, George S, Ramsey J, Holt DW. Fatality attributed to GBL overdose. *Ann Toxicol Analyt* 2009; 21: S1–40.

Button J, McKeown DA, Mathers C, Lee T, Dargan PI, Wood DM, Holt DW. Dying to be thin? – two fatalities attributed to use of 2,4-dinitrophenol. *Ann Toxicol Anal* 2009; 21: S1–49.

Cooper GA, Dyas J, Thompson JP. Know your pet – how important is it to know the snake you own? *Clin Toxicol* 2009; 47: 763.



Cooper GA, Dyas J, Thompson JP. United Kingdom Poisons Information Database (UKPID) – a centralised national database. *Clin Toxicol* 2009; 47: 743.

Cooper GA, Spears RA, Thompson JP. A review of calls received by the UK National Poisons Information Service involving medical errors in hospitals, care homes and GP surgeries from April 2007 to March 2008. *Clin Toxicol* 2009; 47: 509–10.

Dargan PI, Bishop CR, Greene SL, Garnham F, Wood DM. Severe toxicity associated with MDMA ('ecstasy') presentation to the emergency department appears to be more common in those with lone MDMA ingestion. *Clin Toxicol* 2009; 47: 486–7.

Dargan PI, Button J, Davies S, Holt DW, George S, Garnham F, Wood DM. The first reported fatality related to gamma-butyrolactone ingestion. *Clin Toxicol* 2009; 47: 451.

Dargan PI, English E, Butt S, Garnham F, Wood DM. Emergency department patients' knowledge of paracetamol content of common analgesics and cough and cold remedies. *Basic Clin Pharmacol Toxicol* 2009; 105(Suppl 1): 61.

Dargan PI, Greene SL, Bishop CR, Wood DM. Epidemiology and outcome of unintentional and deliberate acetaminophen poisoning. *Clin Toxicol* 2009; 47: 754–5.

Dargan PI, Greene SL, Wood DM. Reported ingested dose of paracetamol is a poor predictor of risk in patients with paracetamol poisoning. *China Preventive Med Assoc* 2009; 1: 85.

Dargan PI, Lolo-Rial C, Warren-Gash C, Wood DM. Estimation of volume of liquid ingested: significance for liquid chemical and drug ingestions. *China Preventive Med Assoc* 2009; 1: 65.

Dargan P, Wood D. Drugs, travel and tourism. *Rev Toxicol* 2009; 26: 15.

Davies S, Puchnarewicz M, Button J, Dargan PI, Wood DM, Archer R, Ramsey J, Lee T, Holt DW. Two cases of confirmed ingestion of the novel designer compounds: 4-methylmethcathinone (Mephedrone) and 3-fluoromethcathinone. *Ann Toxicol Analyt* 2009; 21: S1-60–61.

Davies MD, Thompson JP, Cooper GA. Slimming tablet enquiries recorded by National Poisons Information Service (Cardiff). *Clin Toxicol* 2009; 47: 505.

Dear J, Huizinga T, Nicolai M, Barran P, Walkinshaw M, Simpson K, Bateman DN, Waring WS, Webb DJ. Cyclophilin A is a novel mediator of paracetamol-induced liver injury. *Br J Clin Pharmacol* 2009; 68: 277–8.

Dines AM, Butler C, Taylor I, Ovaska H, Rowland A, Wood DM, Dargan PI. A study to assess the use of pre-hospital charcoal in South East England. *Clin Toxicol* 2009; 47: 493.

Doak MW, Nixon AC, Lupton DJ, Waring WS. Drug overdose in older adults: patterns of drug ingestion, duration of hospital stay, and destination after discharge. *Br J Clin Pharmacol* 2009; 68: 286.

Dyke N, Cooper GA, Thompson JP. Analysis of calls concerning mercury-containing measuring devices to UK National Poisons Information Service. *Clin Toxicol* 2009; 47: 502.

Dyke N, Thompson JP. Successful use of the CIWA-Ar scale for gamma-butyrolactone withdrawal. *Clin Toxicol* 2009; 47: 714–15.

English E, Dargan PI, Wood DM. Final year medical students' knowledge of the paracetamol content of over the counter analgesics, cough-cold remedies and prescription medications. *Clin Toxicol* 2009; 47: 458.

Galal HKA, Hill S, Gray J, Thomas SHL. Differential effects of tricyclic antidepressants in overdose on the QRS interval. *Clin Toxicol* 2009; 47: 474–5.

Galal HKA, Hill S, Hodson K, Gray J, Thomas SHL. Differential clinical toxicity of tricyclic antidepressants in overdose following acute hospital admission. *Clin Toxicol* 2009; 47: 495–6.

Good AM, Bateman DN. Cases of quinine poisoning referred to a poisons information service for specialist advice. *Clin Toxicol* 2009; 47: 448–9.

Good AM, Lupton D, Adams RD, Bateman DN. Ant-killer exposures and poisoning. *Clin Toxicol* 2009; 47: 494.

Graham A, Gray J, Bateman DN, Waring WS. Stated quantity of ingested citalopram corresponds with the risk of toxicity after overdose. *Br J Clin Pharmacol* 2009; 68: 278.

Greene SL, Wood DM, Bishop CR, Dargan PI. Efficacy of intravenous N-acetylcysteine for early non-staggered acetaminophen overdose. *Clin Toxicol* 2009; 47: 713.

Haman PD, Parbat N, Ovaska H, Dargan PI, Wood DM. The availability and use of Intralipid® therapy in England and Wales – a questionnaire based study. *Basic Clin Pharmacol Toxicol* 2009; 105(Suppl 1): 120.

Hodson K, Hill S, Thomas SHL. Effect of lamotrigine overdose on the QT interval. *Clin Toxicol* 2009; 47: 454.

Jackson G, Adams RD, Laing WJ, Good AM, Bateman DN. Scottish demand for poisons information in the year 2007/08 – comparison of telephone enquiries and internet database accesses. *Clin Toxicol* 2009; 47: 480–81.

Jones SSD, Thompson JP. Hypotension and bradycardia following varenicline overdose. *Clin Toxicol* 2009; 47: 458.

Nicolai MPJ, Catterton JH, Huizinga T, Dhaliwal K, Constant SL, Bateman DN, Waring WS, Simpson K, Webb DJ, Dear JW. Cyclophilin is a mediator of paracetamol-induced liver injury. *Basic Clin Pharmacol Toxicol* 2009; 105(Suppl 1): 36.

Nixon AC, Doak MW, Crozier H, Crookes DP, Waring WS. Gender influences the type of agent taken in deliberate antiepileptic drug overdose. *Br J Clin Pharmacol* 2009; 68: 285–6.

Puchnarewicz M, Davies S, Button J, Ramsey J, Wood DM, Dargan PI, Holt DW. Bromo dragonfly: Gives you wings? *Ann Toxicol Analyt* 2009; 21: S1-57.

Stephens S, Jones D, Wilson G, Gilfillan C, McElhatton P, Thomas S. The fetal effects of aspirin overdose during pregnancy. *Clin Toxicol* 2009; 47: 453–4.

Stephens S, Wilson G, Jones D, Thomas SHL. Preliminary data on the use of cannabis in pregnancy. *Reprod Toxicol* 2009; 28: 136.

Thomas SHL. Adverse drug reactions and their relevance to Poison Centers. *Clin Toxicol* 2009; 47: 488–9.

Vale JA. Alcohol withdrawal syndrome: mechanisms, features and management. *Clin Toxicol* 2010; 48: 293–4.



Vale JA. Cadmium-induced nephrotoxicity: a biochemical or clinical disease? *Clin Toxicol* 2009; 47: 490–91.

Wall AJB, Bateman DN, Waring WS. Inconsistencies in overdose management advice offered by summary of product characteristics (SPC) documents. *Br J Clin Pharmacol* 2009; 68: 287.

Wilson G, Jones D, Stephens S, Bradley S, McElhatton P, Thomas SHL. Preliminary data on exposure to trichloroethylene during pregnancy. *Clin Toxicol* 2009; 47: 459.

Wilson G, Stephens S, Jones D, Thomas SHL. Preliminary data on the use of hepatitis A and B vaccines during pregnancy. *Reprod Toxicol* 2009; 28: 137.

Wood DM, Dargan PI. Description of the patterns of recreational drug toxicity in a nightclub environment in London, UK. *Rev Toxicol* 2009; 26: 49.

Wood DM, Davies S, Puchanarewicz M, Button J, Archer R, Holt DW, Dargan PI. Recreational use of 4-methylmethcathinone (4-MMC) presenting with sympathomimetic toxicity and confirmed by toxicological screening. *Clin Toxicol* 2009; 47: 733.

Wood DM, Greene SL, Dargan PI. Characterisation of the difference in pattern and severity of toxicity associated with lone MDMA compared to MDMA with other co-ingestants. *Rev Toxicol* 2009; 26: 49–50.

Wood DM, Greene SL, Dargan PI. Comparison of ECG (EKG) findings in patients presenting with self-reported simultaneous cocaine-ethanol use to those with self-reported lone cocaine use. *Rev Toxicol* 2009; 26: 49.

Wood DM, Greene SL, Dargan PI. QRS and QTc electrocardiogram (ECG) durations in patients presenting with acute toxicity related to either self-reported simultaneous cocaine-ethanol use or self-reported lone cocaine use. *China Preventive Med Assoc* 2009; 1: 174.

Wood DM, Ramsey J, Button J, Davies S, Holt DW, Dargan PI. Recreational drug toxicity, the importance of emerging novel drugs. *Rev Toxicol* 2009; 26: 48–9.

Wood KL, Thompson JP. Liquitabs – a thorough and comprehensive review of the UK national data. *Clin Toxicol* 2009; 47: 459.

Zawahir S, Gawarammana I, Dargan PI, Dawson AH. The in-vitro colchicine release and binding affinity to activated charcoal in simulated gastrointestinal fluids from Gloriosa Superba. *China Preventive Med Assoc* 2009; 1: 314.

## Other

Bateman DN, Dear J. Medicine, poisons, and mystic potion: a personal perspective on paracetamol. Louis Roche lecture, Stockholm, 2009. *Clin Toxicol* 2010; 48: 97–103.

Cooper GA. MSc Thesis. Do meteorological conditions affect self poisoning? Cardiff University, 2009.

Jackson G, Good AM, Bateman DN. A review of UK data and information on pesticide-related effects on human health. A report commissioned by the Pesticide Safety Directorate of the Health and Safety Executive from the National Poisons Information Service Edinburgh Unit. April 2009.

Meulenbelt J, Vale A. Professor Ad N P van Heijst – in memoriam. *Clin Toxicol* 2009; 47: 434–5. Letter.

Povey AC, Rees HG, Thompson JP, Karalliedde L. Prospective cohort study of sheep dip exposure and ‘dipper’s flu’. RR775 Research Report. HSE Books, 2010.

Stephens S, Yates L, Knight M, Wilson G, Jones D, Thomas SHL. AH1N1v Influenza 2009 in pregnancy: a systematic review of published and unpublished data. Report submitted to the HTA as part of an NIHR-funded study.

## Editorial/Commentary

Bateman DN. Limiting paracetamol pack size: has it worked in the UK? *Clin Toxicol* 2009; 47: 536–41. Commentary.

Bateman DN, Sandilands E. European Medicines Evaluation Agency bans dextropropoxyphene: a landmark decision for clinical toxicology? *Clin Toxicol* 2009; 47: 782–3. Commentary.

Sandilands E, Bateman DN. Co-proxamol withdrawal: the effect on drug-related deaths. *Prescriber* 2010; 19 February: 8,38. Editorial.



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